

R: BE, DE, FR, GB, IT, NL

AB The drag reducer for pipeline transport of petroleum products is prep'd. by **polymg.** >40 wt.% of a C12-18 acrylate or methacrylate monomer and an ionic monomer with or without other monomers acting as filler or additive at a temp. of 20-30.degree. with const. stirring. The ionic monomer may be sodium acrylate, sodium methacrylate, 4-**vinyl** sodium benzoate, and 4-**vinyl** pyridinium salts of iodide, chloride, and **acetate**. **Polymn.** initiators may be potassium persulfate, ferrous sulfate, and sodium metabisulfate, or a combination of potassium bromate, **sodium sulfate**, and potassium persulfate or any other water-sol. redox initiator system. Water-sol. nonionic emulsifiers such as **sodium lauryl sulfate** may be used.

IT 151-21-3, **Sodium lauryl sulfate**, reactions 7757-82-6, **Sodium sulfate**, reactions

RL: USES (Uses)

(in prepn. of drag-reducing polymer for petroleum transport by pipeline)

RN 151-21-3 HCAPLUS

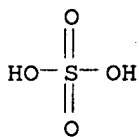
CN Sulfuric acid monododecyl ester sodium salt (8CI, 9CI) (CA INDEX NAME)

HO<sub>3</sub>SO- (CH<sub>2</sub>)<sub>11</sub>-Me

● Na

RN 7757-82-6 HCAPLUS

CN Sulfuric acid disodium salt (8CI, 9CI) (CA INDEX NAME)



2 Na

L48 ANSWER 4 OF 36 HCAPLUS COPYRIGHT 2000 ACS

AN 1992:174864 HCAPLUS

DN 116:174864

TI Preparation of microlatex dispersions using oil-in-water microemulsions

AU Larpent, C.; Tadros, T. F.

CS Dep. Chim. Org., Ec. Natl. Super. Chim. Rennes, Rennes, Fr.

SO Colloid Polym. Sci. (1991), 269(11), 1171-83

CODEN: CPMSB6; ISSN: 0303-402X

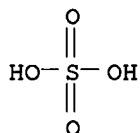
DT Journal

LA English

AB The prepn. of microlatex dispersions from microemulsions of a monomer (styrene, Me methacrylate, or **vinyl acetate**) is described. The microemulsion is prep'd. by forming a H<sub>2</sub>O-in-oil emulsion using a low-HLB surfactant (nonylphenol with 5, 6, or 7 mol ethylene oxide) and then titrating with an aq. soln. of a high-HLB surfactant (nonylphenol with 15 or 16 mol ethylene oxide). A small amt. of anionic surfactant (**Na lauryl sulfate**, Na dodecyl benzene sulfonate, or dioctyl sulfosuccinate) is also incorporated to enhance the stability of the emulsion and facilitate the inversion to an oil-in-H<sub>2</sub>O microemulsion. The droplet-size distribution of the resulting

microemulsion is detd. using photon-correlation spectroscopy. Three different catalysts and 3 different **polymn.** methods are used: thermally induced **polymn.** using K2S2O8, azobis-2-Me propamidinium dichloride (I), or AIBN. All these initiators require heating to 60.degree., i.e. above the stability temp. of the microemulsion. In this case, the microlatexes produced are fairly large (37-100 nm diam.) and have a broad particle-size distribution. The 2nd **polymn.** procedure is chem. induced using a redox system of H2O2 and ascorbic acid. This produces microlatexes with small sizes (18-24 nm diam.) having a narrow-size distribution. The microlatex size is roughly 2-3 times the size of the microemulsion droplets. This shows that collision between 2-3 microemulsion droplets results in their coalescence during the **polymn.** process. The 3rd method of **polymn.** is based on UV irradiation in conjunction with K2S2O8, I or AIBN initiators. In this case, the microlatex is also small (30-63 nm) with a narrow particle-size distribution. Microlatex particles are also prep'd. using a mixt. of monomers (styrene plus Me methacrylate) or mixt. of monomers and methoxy (polyethylene glycol)methacrylate macromonomer. The nonionic latexes are very stable, giving no flocculation up to 6 mol dm<sup>-3</sup> NaCl or CaCl<sub>2</sub> and crit. flocculation concn. (CFC) of 0.6 mol dm<sup>-3</sup> for Na<sub>2</sub>SO<sub>4</sub> or MgSO<sub>4</sub>. Charged latexes are less stable than the nonionic ones. The crit. flocculation temps. (CFT) of all latexes are detd. as a function of electrolyte concn. With the nonionic latexes, CFC is higher than the .theta.-temp. for **poly**(ethylene oxide) at the given electrolyte concn., indicating enhanced steric stabilization as a result of the dense packing of the chains and hence an elastic contribution to the steric interaction. This is not the case with the charged latex, which shows CFT values lower than the .theta.-temp. The lattices contg. methoxy **poly**(ethylene glycol) methacrylate are also less stable towards electrolyte.

IT 7757-82-6, Sodium sulfate, uses  
 RL: USES (Uses)  
 (flocculants, for polystyrene or PMMA or **poly**(vinyl acetate) microlatexes)  
 RN 7757-82-6 HCAPLUS  
 CN Sulfuric acid disodium salt (8CI, 9CI) (CA INDEX NAME)



2 Na

IT 9003-20-7P, **Poly(vinyl acetate)**  
 RL: SPN (Synthetic preparation); PREP (Preparation)  
 (microlatexes, prepn. and droplet size and stability of)  
 RN 9003-20-7 HCAPLUS  
 CN Acetic acid ethenyl ester, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 108-05-4  
 CMF C4 H6 O2



IT 151-21-3, SDS, uses  
 RL: USES (Uses)

(surfactants, in prepn. of polystyrene or PMMA or **poly(vinyl acetate)** microlatexes)

RN 151-21-3 HCAPLUS

CN Sulfuric acid monododecyl ester sodium salt (8CI, 9CI) (CA INDEX NAME)

HO<sub>3</sub>SO-(CH<sub>2</sub>)<sub>11</sub>-Me

● Na

L48 ANSWER 5 OF 36 HCAPLUS COPYRIGHT 2000 ACS

AN 1990:528105 HCAPLUS

DN 113:128105

TI Chemical pellets for **shark**-protection belt

IN **Schneider, David P.**

PA USA

SO U.S., 6 pp. Cont.-in-part of U.S. Ser. No. 199,468.

CODEN: USXXAM

DT Patent

LA English

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
	-----	----	-----	-----	-----
PI	US 4933187	A	19900612	US 1989-394818	19890817
PRAI	US 1988-199468		19880527		

AB A belt includes a pair of opposite layers of sheet material and is subdivided into a series of pockets for receiving pellets of **shark**-repulsive chem. One of the pellets is untreated so as to dissolve in water relatively quickly, another of the pellets is impregnated with water sol. **glue**, another of the pellets is coated with the **glue** while a fourth of the pellets is coated with epoxy for preventing water application to the chem. of the pellet until the pellet is manually broken. The system prolongs the duration of protection against **sharks**. The pellets are made of **anhyd.**

**Na<sub>2</sub>SO<sub>4</sub>** and liq. **Na lauryl sulfate**.

The **glue** is made of **poly(vinyl acetate)**.

IT 9003-20-7, **Poly(vinyl acetate)**

RL: BIOL (Biological study)

(**glue**, for **shark**-repelling pellets, in protective belts)

RN 9003-20-7 HCAPLUS

CN Acetic acid ethenyl ester, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 108-05-4

CMF C4 H6 O2

AcO-CH=CH<sub>2</sub>

IT 151-21-3, **Sodium lauryl sulfate**,  
biological studies 7757-82-6, **Sodium sulfate**  
, biological studies

RL: BIOL (Biological study)

(**shark**-repellent pellets contg., in protective belts)

RN 151-21-3 HCAPLUS

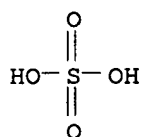
CN Sulfuric acid monododecyl ester sodium salt (8CI, 9CI) (CA INDEX NAME)

HO<sub>3</sub>SO-(CH<sub>2</sub>)<sub>11</sub>-Me

Na

RN 7757-82-6 HCAPLUS

CN Sulfuric acid disodium salt (8CI, 9CI) (CA INDEX NAME)



2 Na

L48 ANSWER 6 OF 36 HCAPLUS COPYRIGHT 2000 ACS

AN 1989:82289 HCAPLUS

DN 110:82289

TI Containers for dentifrices consisting of acrylonitrile-methacrylate-containing laminates

IN Sparacio, Dorinda Ann; Fisher, Steven Wade; Schelm, Sandra Lee

PA Colgate-Palmolive Co., USA

SO Ger. Offen., 6 pp.

CODEN: GWXXBX

DT Patent

LA German

FAN.CNT 1

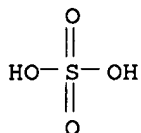
	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	DE 3727761	A1	19880331	DE 1987-3727761	19870820
	US 4775523	A	19881004	US 1986-913784	19860930
	IN 171199	A	19920815	IN 1987-DE743	19870824
	AU 8777497	A1	19880414	AU 1987-77497	19870827
	AU 601761	B2	19900920		
	DK 8704979	A	19880331	DK 1987-4979	19870922
	CH 672425	A	19891130	CH 1987-3663	19870922
	CA 1298791	A1	19920414	CA 1987-547483	19870922
	FR 2604417	A1	19880401	FR 1987-13389	19870928
	FR 2604417	B1	19891222		
	BR 8704962	A	19880517	BR 1987-4962	19870928
	GB 2198349	A1	19880615	GB 1987-22837	19870929
	GB 2198349	B2	19900829		
	BE 1000731	A4	19890321	BE 1987-1107	19870930

PRAI US 1986-913784 19860930

AB A dentifrice is contained in a laminated pouch consisting of an inner layer of butadiene-acrylonitrile-grafted acrylonitrile-methacrylate copolymer and an outer layer. The pouch contains 7-12 mL dentifrice and the ratio of content vol. and the inner surface of the laminate is 16:1-9:1. In contrast to known dentifrices packaged in laminated pouches this dentifrice does not undergo detachment of the laminated polymer layers when stored; the acrylonitrile-methacrylate copolymer laminates also prevent the loss of flavor under these conditions. The outer laminate layers are multilayer laminates of polyethylene, polyester such as poly(ethylene terephthalate), polypropylene, cellophane, or their mixts. which are glued to a metal foil. A gel toothpaste contained glycerol 25.00, sorbitol 38.29, polyethylene glycol 3.00, Na CM-cellulose 0.35, BzONa 0.50, Na<sub>2</sub>FPO<sub>3</sub> 0.76, Na saccharin 0.20, H<sub>2</sub>O 3.00, TiO<sub>2</sub> 0.50, silicic acid (1% Al<sub>2</sub>O<sub>3</sub> content) 18.00, Syloid 244 5.00, calcined Al<sub>2</sub>O<sub>3</sub>

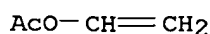
2.00, color (0.1% soln.) 0.70, **Na lauryl sulfate** 1.20, and flavoring material 1.00 parts by wt. Layers of poly(ethylene terephthalate), low-d. polyethylene-based **white glue**, Al foil, Adcoat, and Barex 210 were laminated together; layer thickness was 12, 18, 9, 3, and 51  $\mu\text{m}$ , resp., whereby Barex 210 was in contact with the dentifrice. When stored for 24 wk at room temp. or 9 wk at 49.degree. these containers remain unchanged, and the dentifrice remains a stable gel and does not lose its flavor. When stored in containers laminated with low-d. polyethylene the laminate became detached after 4 wk at room temp. and the gel was unstable and lost its flavor.

L48 ANSWER 7 OF 36 HCAPLUS COPYRIGHT 2000 ACS  
 AN 1987:555220 HCAPLUS  
 DN 107:155220  
 TI Stability of **poly(vinyl acetate)** emulsion against electrolyte  
 AU Ito, Nobuyoshi  
 CS Nagoya Munic. Ind. Res. Inst., Nagoya, 456, Japan  
 SO Nagoya-shi Kogyo Kenkyusho Kenkyu Hokoku (1986), (71), 38-41  
 CODEN: NASKAR; ISSN: 0369-3333  
 DT Journal  
 LA Japanese  
 AB PEG nonylphenyl ether, **Na lauryl sulfate**, and **poly(vinyl alc.)** (I) were used as stabilizers of **poly(vinyl acetate)** emulsion against the action of electrolytic materials such as **Na<sub>2</sub>SO<sub>4</sub>**. Partially sapond. I showed an excellent stabilizing effect. The addn. of stabilizers after the **polymn.** was better than before **polymn.**  
 IT **7757-82-6**, Disodium sulfate, uses and miscellaneous  
 RL: USES (Uses)  
 (poly(vinyl acetate) emulsions in presence of, stabilizers for)  
 RN 7757-82-6 HCAPLUS  
 CN Sulfuric acid disodium salt (8CI, 9CI) (CA INDEX NAME)



2 Na

IT **9003-20-7, Poly(vinyl acetate)**  
 RL: PRP (Properties)  
 (stabilizers for emulsions of, in presence of **sodium sulfate**)  
 RN 9003-20-7 HCAPLUS  
 CN Acetic acid ethenyl ester, homopolymer (9CI) (CA INDEX NAME)  
 CM 1  
 CRN 108-05-4  
 CMF C4 H6 O2



IT **151-21-3, Sodium lauryl sulfate**,

uses and miscellaneous

RL: USES (Uses)

(stabilizers, for **poly(vinyl acetate)**)

emulsion in presence of **sodium sulfate**)

RN 151-21-3 HCAPLUS

CN Sulfuric acid monododecyl ester sodium salt (8CI, 9CI) (CA INDEX NAME)

HO<sub>3</sub>SO- (CH<sub>2</sub>)<sub>11</sub>-Me

● Na

L48 ANSWER 8 OF 36 HCAPLUS COPYRIGHT 2000 ACS

AN 1987:20334 HCAPLUS

DN 106:20334

TI Cleaning compositions for removal of urine

IN Matsumura, Masataka; Egashira, Fumio; Yamada, Tomohiko

PA Matsumura Kagaku Kogyo K. K., Japan

SO Jpn. Kokai Tokkyo Koho, 6 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 61190595	A2	19860825	JP 1985-30723	19850219
AB	Cleaning compns. for fiber products or sand soiled by urine contain granules of water-sol. nonheavy metal inorg. salt peroxides coated with water-sol. synthetic <b>glues</b> , water-sol. nonheavy metal inorg. salt powders, and optionally surfactants and granules of water-sol. org. acids coated with water-sol. synthetic <b>glues</b> and water-sol. nonheavy metal inorg. salt powders and/or water-sol. water-contg. carbon compd. powders. Thus, a compn. comprised K <sub>2</sub> S <sub>2</sub> O <sub>8</sub> 19.0, Na perborate 22.0, <b>Na sulfate</b> 12.0, citric acid 13.0, acid Na carbonate 22.0, <b>Na lauryl sulfate</b> 2.6, Na pyrophosphate 6.37, perfume 1.5, green 0.03, and polyvinylpyrrolidone 1.5%.				

IT 151-21-3, **Sodium lauryl sulfate**,  
uses and miscellaneous **7681-38-1 7757-82-6**,  
**Sodium sulfate**, uses and miscellaneous

RL: USES (Uses)

(cleaning compns., for urine)

RN 151-21-3 HCAPLUS

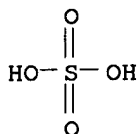
CN Sulfuric acid monododecyl ester sodium salt (8CI, 9CI) (CA INDEX NAME)

HO<sub>3</sub>SO- (CH<sub>2</sub>)<sub>11</sub>-Me

● Na

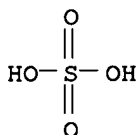
RN 7681-38-1 HCAPLUS

CN Sulfuric acid, monosodium salt (8CI, 9CI) (CA INDEX NAME)



Na

RN 7757-82-6 HCAPLUS  
 CN Sulfuric acid disodium salt (8CI, 9CI) (CA INDEX NAME)



2 Na

L48 ANSWER 9 OF 36 HCAPLUS COPYRIGHT 2000 ACS

AN 1986:444351 HCAPLUS

DN 105:44351

TI Separation membranes

IN Tsurumi, Hiroshi; Kusudo, Osamu; Hamamoto, Yoshito; Yoshimura, Noriaki

PA Kuraray Co., Ltd., Japan

SO Jpn. Kokai Tokkyo Koho, 6 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 61042301	A2	19860228	JP 1984-163937	19840803

AB Sepn. membranes having wet dimensional stability comprise poly(vinyl alc.) partially acetalized with dialdehydes OHC(CH<sub>2</sub>)<sub>7</sub>-10CHO. Thus, H<sub>2</sub>O 100, PVA 124 (av. d.p. 2460; av. sapon. no. 98.5%) 25.5, polyethylene glycol 23, and H<sub>3</sub>BO<sub>3</sub> 1 kg were mixed at 100.degree. to give 149.5 kg soln., which was spun in a bath contg. an aq. soln. of 160 g/L Na<sub>2</sub>SO<sub>4</sub> and 100 g/L NaOH to obtain hollow fibers. The fibers were immersed in an aq. soln. contg. 1,9-nonanedial (I) 4, Na<sub>2</sub>SO<sub>4</sub> 180, H<sub>2</sub>SO<sub>4</sub> 30, and Na lauryl sulfate 4 g/L at 60.degree. for 3 h and washed to form a hollow fiber membrane (outer diam. 580 .mu.; inner diam. 330 .mu.; 20 mol% acetalized), having wet:dry length ratio (at 25.degree.) 1.008 and H<sub>2</sub>O permeation (at 25.degree.) 2,230 L/h-m<sup>2</sup>-kg/cm<sup>2</sup>, compared with 1.045 and 1,850, resp., for fibers prepd. similarly using glutaraldehyde instead of I.

L48 ANSWER 10 OF 36 HCAPLUS COPYRIGHT 2000 ACS

AN 1986:432994 HCAPLUS

DN 105:32994

TI One-step electrochemical image formation process

IN Pliefke, Engelbert

PA Hoechst A.-G., Fed. Rep. Ger.

SO Ger. Offen., 48 pp.

CODEN: GWXXBX

DT Patent

LA German

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	DE 3416867	A1	19851114	DE 1984-3416867	19840508
	US 4614570	A	19860930	US 1985-730632	19850506
	JP 60244597	A2	19851204	JP 1985-96152	19850508

PRAI DE 1984-3416867 19840508

AB A 1-step electrochem. imaging and development or decoating process for use with com. reprodn. layers upon the usual supports is described. In the process, the material, which has an elec. conductive support, is subjected to an elec. current by .gtoreq.1 needle-like electrode in the presence of an aq. electrolyte soln. contg. .gtoreq.1 salt of an org. or inorg. acid from 0.1 wt.% up to satn. and having a pH of 2.0 to 10.0. Thus, an electrochem. roughened and anodically oxidized Al foil was flow-coated with a pos.-working compn. contg. a cresol-HCHO novolak 6.6, 4-(2-phenylprop-2-yl)phenyl 1,2-naphthoquinone-2-diazido-4-sulfonate 1.1, 2,2'-bis[1,2-naphthoquinone-2-diazido-5-sulfonyloxy]dinaphthyl-1,1'-methane 0.6, 1,2-naphthoquinone-2-diazido-4-sulfonyl chloride 0.24, crystal violet 0.08, and a BuOAc-ethylene glycol mono-Me ether-THF (1:4-5) mixt. 91.36 parts, dried, placed in an aq. electrolyte soln. contg. Li2SO4 3 and Na octyl sulfate 1% (pH 3.5) and imaged with a needle electrode.

IT 151-21-3, uses and miscellaneous 7757-82-6, uses and miscellaneous

RL: USES (Uses)

(electrolyte soln. contg., in one-step electrochem. imaging and development of photosensitive offset lithog. plates)

RN 151-21-3 HCAPLUS

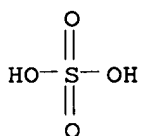
CN Sulfuric acid monododecyl ester sodium salt (8CI, 9CI) (CA INDEX NAME)

HO3SO<sup>-</sup> (CH2)<sub>11</sub>-Me

● Na

RN 7757-82-6 HCAPLUS

CN Sulfuric acid disodium salt (8CI, 9CI) (CA INDEX NAME)



2 Na

IT 9003-20-7

RL: USES (Uses)

(offset lithog. plates with photosensitive layer contg., one-step electrochem. imaging and development process for)

RN 9003-20-7 HCAPLUS

CN Acetic acid ethenyl ester, homopolymer (9CI) (CA INDEX NAME)

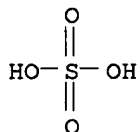
CM 1

CRN 108-05-4

CMF C4 H6 O2

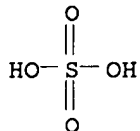


L48 ANSWER 11 OF 36 HCAPLUS COPYRIGHT 2000 ACS  
 AN 1985:32180 HCAPLUS  
 DN 102:32180  
 TI Production of polymer films containing oil-soluble materials  
 AU Chukhadzhyan, G. A.; Sarkisyan, F. A.; Karapetyan, S. A.; Gabrielyan, E. S.  
 CS Erevan. Med. Inst., Yerevan, USSR  
 SO Arm. Khim. Zh. (1984), 37(8), 512-17  
 CODEN: AYKZAN; ISSN: 0515-9628  
 DT Journal  
 LA Russian  
 AB High-viscosity stable emulsions of lipophilic substances (sea buckthorn oil, propolis, cerebrosides, and lipophilic vitamins) were prepd. with emulsifiers (e.g., Tween 20 [9005-64-5], Tween 80 [9005-65-6], Triton X-100 [9002-93-1], **Na lauryl sulfate** [151-21-3] and glycerol monostearate [31566-31-1]), preservatives (e.g., Na metabisulfite, Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub>, or Me p-hydroxybenzoate [99-76-3]) hydrophilic **polymers** such as **poly(vinylpyrrolidone)** [9003-39-8], polyethylene glycol [25322-68-3] or partially hydrolyzed **poly(vinyl acetate)**. The emulsions were used for the prepn. of bilayer tissue-adhesive films. The films were wrapped and sterilized by <sup>60</sup>Co .gamma.-radiation or UV radiation.  
 IT **7681-38-1 7757-82-6**, biological studies  
 9003-20-7D, hydrolyzed  
 RL: BIOL (Biological study)  
 (emulsions contg. surfactants and, for tissue-adhesive bilayer films)  
 RN 7681-38-1 HCAPLUS  
 CN Sulfuric acid, monosodium salt (8CI, 9CI) (CA INDEX NAME)



Na

RN 7757-82-6 HCAPLUS  
 CN Sulfuric acid disodium salt (8CI, 9CI) (CA INDEX NAME)



2 Na

RN 9003-20-7 HCAPLUS  
 CN Acetic acid ethenyl ester, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 108-05-4  
CMF C4 H6 O2

AcO-CH=CH<sub>2</sub>

IT 151-21-3, biological studies  
RL: BIOL (Biological study)  
(emulsions contg., for tissue-adhesive bilayer films)  
RN 151-21-3 HCAPLUS  
CN Sulfuric acid monododecyl ester sodium salt (8CI, 9CI) (CA INDEX NAME)

HO<sub>3</sub>SO-(CH<sub>2</sub>)<sub>11</sub>-Me

● Na

L48 ANSWER 12 OF 36 HCAPLUS COPYRIGHT 2000 ACS  
AN 1984:165448 HCAPLUS  
DN 100:165448  
TI Electrochemical development process for copying layers  
IN Pliefke, Engelbert  
PA Hoechst A.-G., Fed. Rep. Ger.  
SO Ger. Offen., 38 pp.  
CODEN: GWXXBX  
DT Patent  
LA German  
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	DE 3134054	A1	19830505	DE 1981-3134054	19810828
	ZA 8205879	A	19830629	ZA 1982-5879	19820813
	CA 1189378	A1	19850625	CA 1982-409425	19820813
	US 4549944	A	19851029	US 1982-408906	19820817
	EP 73445	B1	19860611	EP 1982-107707	19820823
	R: AT, BE, CH, DE, FR, GB, IT, LI, NL, SE				
	AT 20394	E	19860615	AT 1982-107707	19820823
	AU 8287543	A1	19830303	AU 1982-87543	19820824
	JP 58042042	A2	19830311	JP 1982-146306	19820825
	JP 03047495	B4	19910719		
	FI 8202965	A	19830301	FI 1982-2965	19820826
	ES 515330	A1	19830601	ES 1982-515330	19820827
	BR 8205025	A	19830809	BR 1982-5025	19820827
PRAI	DE 1981-3134054		19810828		
	EP 1982-107707		19820823		

AB Photosensitive compns. for offset printing plates and photoresists are readily electrochem. developed by removing the nonexposed portion of the photosensitive layer with an aq. electrolyte bath at pH 2-10 contg. .gtoreq.1 org. or inorg. acid salt from 0.1 wt.% to the satn. limit and a surfactant 0.1-5 wt.% with a c.d. of 1-100 A/dm<sup>2</sup> at 20-70%. Thus, an electrochem. roughened and anodized Al foil was coated with a pos-working photosensitive compn. contg. cresol-HCHO polymer, 4-(2-phenylprop-2-yl)phenyl 1,2-naphthoquinone-2-diazide-4-sulfonate, 2,2'-bis(1,2-naphthoquinone-2-diazide-5-sulfonyloxy)dinaphthyl-(1,1')-methane, 1,2-naphthoquinone-2-diazide-4-sulfochloride, crystal violet, ethylene glycol monomethyl ether, THF, and BuOAc. This coated plate was exposed and the developed in a soln. contg. 3% Li<sub>2</sub>SO<sub>4</sub> and 1% Na octyl sulfate at pH 3.5 under 20 V for 11-14 s to give a printing plate.

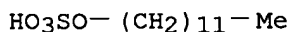
IT 151-21-3, uses and miscellaneous 7757-82-6, uses and miscellaneous

RL: USES (Uses)

(electrolyte soln. contg., in electrochem. development of  
photosensitive offset lithog. plates)

RN 151-21-3 HCAPLUS

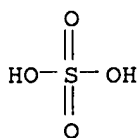
CN Sulfuric acid monododecyl ester sodium salt (8CI, 9CI) (CA INDEX NAME)



● Na

RN 7757-82-6 HCAPLUS

CN Sulfuric acid disodium salt (8CI, 9CI) (CA INDEX NAME)



2 Na

IT 9003-20-7

RL: TEM (Technical or engineered material use); USES (Uses)  
(photoresist compns. contg., electrochem. development of)

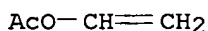
RN 9003-20-7 HCAPLUS

CN Acetic acid ethenyl ester, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 108-05-4

CMF C4 H6 O2



L48 ANSWER 13 OF 36 HCAPLUS COPYRIGHT 2000 ACS

AN 1983:4992 HCAPLUS

DN 98:4992

TI Interaction of surfactants with polymers in aqueous solution. III.  
Viscometric studies

AU Gilanyi, Tibor; Wolfram, Ervin

CS Kolloidkem. Kolloidtechnol. Tansz., ELTE, Budapest, 1445, Hung.

SO Magy. Kem. Foly. (1982), 88(9), 411-16

CODEN: MGKFA3; ISSN: 0025-0155

DT Journal

LA Hungarian

AB The formation of complex aggregates from interaction of Na

**dodecyl sulfate** (I) [151-21-3] and

**polymers** [poly(vinyl alc.) (II) [9002-89-5],

**vinyl acetate-vinyl alc. copolymer** (III)

[25213-24-5], **poly**(vinylpyrrolidinone) (IV) [9003-39-8],

**poly**(ethylene oxide) (V) [25322-68-3] and dextran [9004-54-0]]

in aq. soln. was studied by a viscosimetric method. Intrinsic viscosities

[.eta.] were detd. by diln. of the solns. at const. **polymer**-I

complex compns. The [.eta.] of the **polymer** soln. increased with

I content of the complex in the case of II, III, and IV, and decreased for

the V-I system as compared with that of the **polymer** with no added surfactant. No interaction was obsd. between I and dextran. In the presence of 0.1 M NaNO<sub>3</sub> excess, a min. appeared in the [.eta.] vs. complex compn. curve for the III-I and IV-I systems, but the typical shape of the curves for systems based on II or V were unaffected by addn. of salt.

IT 151-21-3, properties

RL: PRP (Properties)

(interaction of, with polymers in aq. soln.)

RN 151-21-3 HCAPLUS

CN Sulfuric acid monododecyl ester sodium salt (8CI, 9CI) (CA INDEX NAME)

HO<sub>3</sub>SO- (CH<sub>2</sub>)<sub>11</sub>-Me

● Na

L48 ANSWER 14 OF 36 HCAPLUS COPYRIGHT 2000 ACS

AN 1981:542029 HCAPLUS

DN 95:142029

TI Mixture for developing exposed photosensitive copying layers

IN Sprintschnik, Gerhard; Neubauer, Rudolf; Buhr, Gerhard

PA Hoechst A.-G., Fed. Rep. Ger.

SO Ger. Offen., 33 pp.

CODEN: GWXXBX

DT Patent

LA German

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	DE 2941960	A1	19810430	DE 1979-2941960	19791017
	AU 8062706	A1	19810430	AU 1980-62706	19800925
	AU 535273	B2	19840308		
	CA 1156085	A1	19831101	CA 1980-361610	19801006
	EP 27932	A1	19810506	EP 1980-106128	19801009
	EP 27932	B1	19830518		
	R: AT, BE, DE, FR, GB, IT, NL, SE				
	AT 3473	E	19830615	AT 1980-106128	19801009
	US 4339530	A	19820713	US 1980-196279	19801014
	BR 8006657	A	19810422	BR 1980-6657	19801016
	JP 56070548	A2	19810612	JP 1980-144558	19801017
	JP 63020328	B4	19880427		

PRAI DE 1979-2941960 19791017

EP 1980-106128 19801009

AB Developer mixts. for the development, as well as fixing and preservation, of exposed light-sensitive layers, esp. presensitized printing plates, are composed of a water-sol. or water-dispersible mixed polymer with hydrophilic units of the formula -(CH<sub>2</sub>CHR)<sub>n</sub>- (R = OR<sub>1</sub> or NR<sub>2</sub>R<sub>3</sub> where R<sub>1</sub> = H, Me; R<sub>2</sub> = H, C<sub>1</sub>-10 alkyl, or C<sub>2</sub>-10 alkoxyalkyl, or C<sub>6</sub>-10 aryl; R<sub>3</sub> = alkyl or C<sub>1</sub>-5 acyl) and hydrophobic units of a vinyl monomer whose homopolymer is insol. and which contains arom. or long chain aliph. units as substituents 0.5-10, water 1-15, sol. alc. .ltoreq. 10, ionic surfactant 0.05-5, a salt 0.1-10, and an acid 0.1-8 wt.%. Thus, a typical developer compn. contained 4-phenyl-2-butanol 4.5, dioctyl maleate-N-vinyl-N-methylacetamide copolymer (12:88) 5, 85% H<sub>3</sub>PO<sub>4</sub> 2.5, Na octylsulfate 0.2, MgSO<sub>4</sub> 3, and water 100 g.

IT 151-21-3, uses and miscellaneous 7757-82-6, uses and miscellaneous

RL: USES (Uses)

(developer compns. contg., for presensitized printing plates)

RN 151-21-3 HCAPLUS

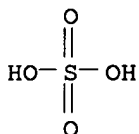
CN Sulfuric acid monododecyl ester sodium salt (8CI, 9CI) (CA INDEX NAME)

HO<sub>3</sub>SO-(CH<sub>2</sub>)<sub>11</sub>-Me

Na

RN 7757-82-6 HCAPLUS

CN Sulfuric acid disodium salt (8CI, 9CI) (CA INDEX NAME)



2 Na

IT 9003-20-7

RL: USES (Uses)

(photoimaging compns. contg., developer compns. for)

RN 9003-20-7 HCAPLUS

CN Acetic acid ethenyl ester, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 108-05-4

CMF C4 H6 O2

AcO-CH=CH<sub>2</sub>

L48 ANSWER 15 OF 36 HCAPLUS COPYRIGHT 2000 ACS

AN 1979:524221 HCAPLUS

DN 91:124221

TI Latexes with uniform grain size

IN Tsubota, Katsuya; Kobayashi, Sadanori

PA Kanegafuchi Chemical Industry Co., Ltd., Japan

SO Jpn. Kokai Tokkyo Koho, 5 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 54060388	A2	19790515	JP 1977-127018	19771021
	JP 60059922	B4	19851227		

AB In aq. media, vinyl chloride and optionally other vinyl monomers are emulsion **polymd.** (>5% yield) in the presence of 0.001-0.08% emulsifiers and C8-18 alcs. and mixed further with 0.05-0.8% emulsifiers. The emulsifiers may be added at once during the yield stage of 10-30% or continuously during that of 5-20%. Thus, 930 g **vinyl** chloride and 70 g **vinyl acetate** were stirred for 3 h (5% yield) at 45.degree./25 mm in a 3-L stainless steel autoclave contg. H<sub>2</sub>O 2000, **Na lauryl sulfate** (I) [151-21-3] 0.03, lauryl alc. [112-53-8] 0.02, and (NH<sub>4</sub>)<sub>2</sub>S<sub>2</sub>O<sub>8</sub> 1 g and 8 g I was added over 14 h at a const. rate to give a stable copolymer [9003-22-9] with 0.25.mu. particle size.

IT 151-21-3, uses and miscellaneous

RL: USES (Uses)

(emulsifying agents, contg. lauryl alc., for manuf. of vinyl acetate-vinyl chloride copolymer latexes)

RN 151-21-3 HCAPLUS

CN Sulfuric acid monododecyl ester sodium salt (8CI, 9CI) (CA INDEX NAME)

 $\text{HO}_3\text{SO}-(\text{CH}_2)_{11}-\text{Me}$ 

● Na

L48 ANSWER 16 OF 36 HCAPLUS COPYRIGHT 2000 ACS

AN 1978:475607 HCAPLUS

DN 89:75607

TI Viscosimetric investigations of the interaction between water-soluble polymers and commercial surfactant mixtures

AU Wolf, Friedrich; Koch, Ursula

CS Martin-Luther-Univ. Halle-Wittenberg, Sekt. Chem., Halle/Saale, E. Ger.

SO Faserforsch. Textiltech. (1978), 29(6), 402-6

CODEN: FSTXA7; ISSN: 0014-8628

DT Journal

LA German

AB The formation of adsorption complexes between anionic surfactants and water-sol. poly(vinyl alc.) (I) [9002-89-5], methyl cellulose (II) [9004-67-5], or polyacrylamide (III) [9003-05-8] was detected by viscosimetry. Partially crosslinked anionic surfactants formed no complexes. Distinct complexes were formed from ethoxylated nonylphenol and I, II, or III. Adsorption complexes were also formed from ethoxylated nonylphenol and anionic surfactants, the adsorption increasing with increasing oxyethylene chain length. No complexes between cationic surfactants and water-sol. polymers were detected.

IT 9003-20-7D, hydrolyzed

RL: USES (Uses)

(complexation of, with surfactants, viscosimetric detn. of)

RN 9003-20-7 HCAPLUS

CN Acetic acid ethenyl ester, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 108-05-4

CMF C4 H6 O2

 $\text{AcO}-\text{CH}=\text{CH}_2$ 

IT 151-21-3, analysis 7664-93-9D, alkyl esters

RL: ANST (Analytical study)

(complexation of, with water-sol. polymers, viscosimetric detn. of)

RN 151-21-3 HCAPLUS

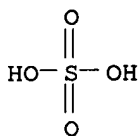
CN Sulfuric acid monododecyl ester sodium salt (8CI, 9CI) (CA INDEX NAME)

 $\text{HO}_3\text{SO}-(\text{CH}_2)_{11}-\text{Me}$ 

Na

RN 7664-93-9 HCAPLUS

CN Sulfuric acid (8CI, 9CI) (CA INDEX NAME)



L48 ANSWER 17 OF 36 HCAPLUS COPYRIGHT 2000 ACS  
 AN 1977:17076 HCAPLUS  
 DN 86:17076  
 TI Kinetics and mechanism of the emulsion **polymerization** of **vinyl acetate**  
 AU Nomura, M.; Harada, M.; Eguchi, W.; Nagata, S.  
 CS Dep. Chem. Eng., Kyoto Univ., Kyoto, Japan  
 SO Polym. Prepr., Am. Chem. Soc., Div. Polym. Chem. (1975), 16(1), 217-22  
 CODEN: ACPPAY  
 DT Journal  
 LA English  
 AB The no. of **polymer** particles produced in the emulsion **polymn.** of **vinyl acetate** (I) [108-05-4] in presence of **lauryl Na sulfate** (II) [151-21-3] and K2S2O8 at 50.degree. is proportional to 0.94 and 0.04th order of initial II and K2S2O8 concns., resp., and independent of I concn.; and the rate of above **polymn.** is proportional to 0.13, 0.50, and 0.34th order of initial II, K2S2O8, and I concns., resp.  
 IT 151-21-3, uses and miscellaneous  
 RL: USES (Uses)  
 (emulsifiers, for **polymn.** of **vinyl acetate**, **polymn.** kinetics in relation to)  
 RN 151-21-3 HCAPLUS  
 CN Sulfuric acid monododecyl ester sodium salt (8CI, 9CI) (CA INDEX NAME)

HO3SO- (CH2)11-Me

● Na

L48 ANSWER 18 OF 36 HCAPLUS COPYRIGHT 2000 ACS  
 AN 1975:594999 HCAPLUS  
 DN 83:194999  
 TI Fire-resistant vinal fibers  
 IN Araki, Michiya; Fujiyama, Yusen; Matsuo, Kazuto  
 PA Kohjin Co., Ltd., Japan  
 SO Japan. Kokai, 8 pp.  
 CODEN: JKXXAF  
 DT Patent  
 LA Japanese  
 FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 50065547	A2	19750603	JP 1973-113802	19731012
	JP 57015136	B4	19820329		

AB Emulsions of copolymers derived from Cl-contg. vinyl monomers, other vinyl monomers, and 0.05-1.5 mole% crosslinking monomers are mixed with 40-250% (based on copolymer) **poly**(vinyl alc.) (I) to give materials for fibers and films. Thus, a mixt. of I (d.p. 500) 10.9, **lauryl Na sulfate** 9.6, K2S2O8 0.76, H2O 510, vinyl chloride 218, and divinyl benzene (II) 2.28 parts was stirred 8 hr at 55.degree. to give a 31.9% solids copolymer [9069-85-6] emulsion. The emulsion was

mixed with 15% solids aq. I to 60% I (based on total **polymers**), and the mixt. was filtered, spun into aq. **Na<sub>2</sub>SO<sub>4</sub>**, dried, drawn, heat-set, and acetalated to give fibers having tenacity 3.05 g/denier, whiteness after 15 min at 180.degree. 42%, heat-shrinkage after 20 min at 180.degree. 5%, and hot-water shrinkage (30 min 100.degree.) 2%, compared with 2.86, 18, 18, and 6, resp., for similar fibers without II units. Similarly used were diallyl maleate-**vinyl** chloride-vinylidene chloride copolymer [57069-47-3] and allyl acrylate-**vinyl acetate-vinyl** chloride copolymer [42767-43-1] emulsions.

L48 ANSWER 19 OF 36 HCAPLUS COPYRIGHT 2000 ACS

AN 1975:549210 HCAPLUS

DN 83:149210

TI Aqueous dispersions of electrophoretic varnishes having good resistance to softening by heat and soldering properties

IN Shibayama, Kyoichi; Ono, Hiroshi; Jidai, Eiki; Saeki, Hideo

PA Mitsubishi Electric Corp., Japan

SO Japan. Kokai, 5 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 50039333	A2	19750411	JP 1973-90371	19730811
	JP 51039898	B4	19761030		

AB Methacrylates, acrylonitrile (I), **vinyl acetate** (II), styrene, and methacrylic acid (III) were emulsion-copolymd. to prep. varnishes. Thus, a mixt. of H<sub>2</sub>O 40, I 2, styrene 1, II 1.5, Et methacrylate 2, Me methacrylate 3, III 0.5, and **lauryl Na sulfate** 0.1 part at 60.degree. was mixed with 0.015 part (NH<sub>4</sub>)<sub>2</sub>S<sub>2</sub>O<sub>8</sub> and 0.005 NaHSO<sub>3</sub>, heated at 60-70.degree. for 5 hr to prep. an aq. **polymer** [56552-21-7] dispersion, and electrodeposited on Cu wire.

L48 ANSWER 20 OF 36 HCAPLUS COPYRIGHT 2000 ACS

AN 1975:74116 HCAPLUS

DN 82:74116

TI Microporous films

IN Bridgeford, Douglas J.

PA Tee-Pak, Inc.

SO U.S., 9 pp.

CODEN: USXXAM

DT Patent

LA English

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 3852224	A	19741203	US 1972-289197	19720914

AB Films contg. micellar size, uniform pores were prepd. by dispersing a surfactant in a polymer, casting a film, and swelling the film with hot water to extract the surfactant to give porous films useful as filters for bacteria, polymer latexes, or as binders for ion exchange resins. Thus, 500g viscose soln. contg. 7.7% cellulose and 6.4% NaOH was mixed with 10.2 g Aerosol OT-B [1639-66-3], centrifuged to remove air, and the mixt. was cast on a plate and coagulated with H<sub>2</sub>SO<sub>4</sub>- **Na<sub>2</sub>SO<sub>4</sub>** soln. to give a hard film. The film was washed with water 5 hr at 60.degree., causing the film to swell and leaching out the surfactant to give an opaque, microporous film.

IT **151-21-3P**, reactions

RL: RCT (Reactant); PREP (Preparation)

(leaching of, from plastic films, for microporous films)

RN 151-21-3 HCAPLUS

CN Sulfuric acid monododecyl ester sodium salt (8CI, 9CI) (CA INDEX NAME)

HO<sub>3</sub>SO- (CH<sub>2</sub>)<sub>11</sub>-Me

Na

IT 9003-20-7  
 RL: USES (Uses)  
 (microporous films)  
 RN 9003-20-7 HCAPLUS  
 CN Acetic acid ethenyl ester, homopolymer (9CI) (CA INDEX NAME)  
 CM 1  
 CRN 108-05-4  
 CMF C4 H6 O2

AcO-CH=CH<sub>2</sub>

L48 ANSWER 21 OF 36 HCAPLUS COPYRIGHT 2000 ACS  
 AN 1974:404351 HCAPLUS  
 DN 81:4351  
 TI Anionic complexes of monomeric emulsion stabilizers  
 IN Samour, Carlos M.  
 PA Kendall Co.  
 SO U.S., 4 pp.  
 CODEN: USXXAM  
 DT Patent  
 LA English  
 FAN.CNT 6

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 3759982	A	19730918	US 1970-40705	19700526
	DE 2051479	A1	00000000	DE 1970-2051479	11111111
	GB 1298099	A	19721129	GB 1970-1298099	19701002
	ES 384655	A1	19730316	ES 1970-384655	19701017
	NO 139958	C	19790613	NO 1970-3944	19701019
	NO 139958	B	19790305		
	NL 7015362	A	19710422	NL 1970-15362	19701020
	NL 166700	B	19810415		
	NL 166700	C	19810915		
	CH 562262	A	19750530	CH 1970-15468	19701020
	DE 2051479	C2	19820211	DE 1970-2051479	19701020
	DK 154423	B	19881114	DK 1970-5325	19701020
	DK 154423	C	19890417		
	CA 1083153	A1	19800805	CA 1971-111778	19710429
PRAI	US 1969-867899		19691020		
	US 1969-867900		19691020		
	US 1970-40705		19700526		

AB Acrylonitrile-allylhexadecyldimethylammonium dodecylbenzenesulfonate-butyl acrylate-ethyl acrylate copolymer (I) [51732-67-3] or a similar copolymer was prep'd. which was self-emulsifiable and did not coagulate during polymn. in water. Thus, 35.5 g allylhexadecyldimethylammonium chloride [51706-18-4] in 115.5 g water reacted with 35.8 g Na dodecylbenzenesulfonate [25155-30-0] during 24 hr to prep. allylhexadecyldimethylammonium dodecylbenzenesulfonate [51705-91-0] which (3 g) was mixed with Et acrylate 80, Bu acrylate 10, acrylonitrile 10, and water 280 g and treated slowly at 17.deg. with 10 ml 3% H<sub>2</sub>O<sub>2</sub> followed by 4 ml reductant soln. (0.02 g ferrous ammonium sulfate and 0.4 g ascorbic acid in 10 ml H<sub>2</sub>O) to prep. I.  
 IT 151-21-3, reactions  
 RL: RCT (Reactant)

(with allylhexadecyldimethylammonium chloride)

RN 151-21-3 HCAPLUS

CN Sulfuric acid monododecyl ester sodium salt (8CI, 9CI) (CA INDEX NAME)

HO<sub>3</sub>SO-(CH<sub>2</sub>)<sub>11</sub>-Me

● Na

L48 ANSWER 22 OF 36 HCAPLUS COPYRIGHT 2000 ACS

AN 1974:84577 HCAPLUS

DN 80:84577

TI Poly(vinyl alcohol) fibers production having excellent affinity for dyes, containing methacrylonitrile

IN Takashima, Shosuke; Ando, Masashi; Imai, Kiyokazu

PA Kuraray Co., Ltd.

SO Japan., 4 pp.

CODEN: JAXXAD

DT Patent

LA Japanese

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 47044035	B4	19721107	JP 1968-83067	19681113

AB Vinal fibers with good affinity for cationic dyes were manufd. by emulsion polymn. of methacrylonitrile (I) with **PVA** to give a 5-50; 93-50 mole ratio methacrylonitrile-vinyl alc. copolymer [50494-94-5]. Thus, 5.0 parts I, 0.1 parts **lauryl Na sulfate**, 85 parts of a 13.5% aq. soln. of 97 mole % **PVA** of d.p. 1700 and saponification degree 99 at 60.deg., 0.05 parts K<sub>2</sub>S<sub>2</sub>O<sub>8</sub>, and 0.002 parts acidic Na sulfite were heated 4 hrs at 60.deg. at pH 6.2, filtered under pressure, defoamed at 60-5.deg. for 3 hrs, wet-spun into **Na<sub>2</sub>SO<sub>4</sub>** coagulant, and treated with formalin to give a fiber with good dyeing properties.

L48 ANSWER 23 OF 36 HCAPLUS COPYRIGHT 2000 ACS

AN 1974:38207 HCAPLUS

DN 80:38207

TI Poly(vinyl alcohol)-poly(vinyl chloride) blend fibers with high tenacity and good dyeability

IN Ashikaga, Tadao; Ohmori, Akio; Ando, Masashi

PA Kuraray Co., Ltd.

SO Japan. Kokai, 7 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 48067511	A2	19730914	JP 1971-102814	19711217
	JP 52006370	B4	19770222		

AB A fiber from a blend of 55-90 wt. % **poly(vinyl alc.)** (I) of d.p. >500 with <0.5 mole % unsapond **acetate** and 10-45 wt. % PVC contg. 0.02-0.5 wt. % (based on I) boric acid [10043-35-3] is oriented to the fiber direction to give a fiber with good strength and dyeability. Thus, a soln. contg. 16.2% I of d.p. 1700 with 2.2 mole % unsapond. acetate and 1.5% (based on I) H<sub>3</sub>BO<sub>3</sub> at 60.deg. was mixed with a PVC emulsion of pH 7 and particle size 200 .ang. contg. **Na lauryl sulfate** to give a 15.7% solids 85:15 I-PVC compn. which was aged 1 day and spun into an aq. soln. contg. 50 g/l. NaOH and 160 g/l. **Na<sub>2</sub>SO<sub>4</sub>**, drawn 100%, neutralized, drawn 100% in hot water, washed until the residual H<sub>3</sub>BO<sub>3</sub> reached 0.1% (based on I), passed

through a 400 g/l. **Na<sub>2</sub>SO<sub>4</sub>** bath, dried, drawn 200% at 228.deg., and shrunk 10% at 231.deg. to give a 2-denier fiber with unsapond. acetate <0.1 mole %, tenacity 9.2 g/denier, hot water resistance 118.deg., and dyeability (K/S value after dyeing with 3% Sumiacryl Blue 3R, cationic dye) 10.9.

L48 ANSWER 24 OF 36 HCAPLUS COPYRIGHT 2000 ACS

AN 1974:4812 HCAPLUS

DN 80:4812

TI Elastic fiber

IN Ishiguro, Shigetaka; Takenishi, Shohichiro

PA Nisshin Spinning Co., Ltd.

SO Japan., 3 pp.

CODEN: JAXXAD

DT Patent

LA Japanese

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 47039729	B4	19721007	JP 1969-66871	19690826
AB	<p>Acrylic-polyurethane composite fibers with high elasticity, strength, and Young's modulus were manufd. by melt spinning a mixt. of a diisocyanate-glycol-polyether (or polyester) polyurethane and an acrylonitrile <b>polymer</b> into heated air. Thus, a mixt. of .alpha.,.omega.-dihydroxypoly(ethylene tetramethylene adipate) (av. d.p. 2020) 1930, tetramethylene glycol (I) 67, 4,4'-diphenylmethane diisocyanate 875 parts contg. DMF was <b>polymd.</b> at 100.deg. for 1 hr, 139 parts I added, and <b>polymn.</b> continued at 100.deg. for 20 min to form 4,4'-diphenylmethane diisocyanate-.alpha.,.omega.-dihydroxypoly(ethylene tetramethylene adipate)-tetramethylene glycol <b>polymer</b> (II) [27083-55-2]. Sep., a mixt. of water 900, <b>lauryl Na sulfate</b> 1, K<sub>2</sub>S<sub>2</sub>O<sub>8</sub> 1, acrylonitrile 94, and <b>vinyl acetate</b> 6 parts contg. DMF was <b>polymd.</b> at 70.deg. to form acrylonitrile-<b>vinyl acetate polymer</b> (III) [24980-62-9]. A 50:50 mixt. of II and III was melt spun into 170.deg. air to give a 3.2-denier yarn with tenacity 1.2 g/denier, elongation 187%, Young's modulus 10 g/denier, and 100%-elongation elastic recovery 79%.</p>				

L48 ANSWER 25 OF 36 HCAPLUS COPYRIGHT 2000 ACS

AN 1972:515433 HCAPLUS

DN 77:115433

TI Low-temperature stabilization of an insoluble vinyl polymer-anionic surfactant solution

IN Maruta, Iwao; Arai, Akihiko; Iida, Akihiko

PA Kao Soap Co., Ltd.

SO Japan., 4 pp.

CODEN: JAXXAD

DT Patent

LA Japanese

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 47001550	B4	19720117	JP 1966-80529	19661208
AB	<p>Urea [57-13-6] was added to an emulsion of a <b>vinyl resin</b>, e.g. <b>poly(vinyl acetate)</b> (I) [9003-20-7], a <b>poly(vinyl acetal)</b>, or Me methacrylate-ethyl acrylate copolymer [9010-88-2], dispersed in water with an anionic surfactant to improve its low-temp. stability. Thus, 10 g of a 50% solids I emulsion contg. 2% polyethylene glycol nonylphenyl ether was slowly added to 90 g of an aq. soln. contg. 16 g 97% <b>Na dodecyl sulfate</b> [151-21-3] to give a clear soln. The soln. became cloudy at .leg.13.deg., but when 10 g urea was added to it, the soln. stayed clear at .geq.-1.4.deg..</p>				
IT	9003-20-7				
RL:	USES (Uses)				

(emulsions, contg. anionic surfactants, low-temp.-stabilized by urea)

RN 9003-20-7 HCAPLUS

CN Acetic acid ethenyl ester, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 108-05-4

CMF C4 H6 O2

 $\text{AcO}-\text{CH}=\text{CH}_2$ 

IT 151-21-3, uses and miscellaneous

RL: USES (Uses)

(vinyl polymer emulsions contg., low-temp.-stabilized by urea)

RN 151-21-3 HCAPLUS

CN Sulfuric acid monododecyl ester sodium salt (8CI, 9CI) (CA INDEX NAME)

 $\text{HO}_3\text{SO}-(\text{CH}_2)_{11}-\text{Me}$ 

● Na

L48 ANSWER 26 OF 36 HCAPLUS COPYRIGHT 2000 ACS

AN 1970:91668 HCAPLUS

DN 72:91668

TI Effect of added salt on the interaction between polymer and detergent in aqueous solution

AU Horin, Shoji; Arai, Haruhiko

CS Household Goods Res. Lab., Kao Soap Co., Ltd., Tokyo, Japan

SO J. Colloid Interface Sci. (1970), 32(3), 547-50

CODEN: JCISA5

DT Journal

LA English

AB The effect of added NaCl on the interaction between poly(

**vinyl acetate**) (I) and **Na dodecyl****sulfate** (II) was studied in terms of surface tension, viscosity, and solubilization of Yellow-OB. The surface tension-concn. curve gives two transition points which show the concn. where the adsorption of II on I first occurs and where II adsorbs totally. The crit. micelle concn. of II and the transition point of I-II are lowered by the addn. of NaCl. On increasing the concn. of NaCl in the I-II soln., the reduced viscosity decreases and the solubilization ability increases. The effect of added NaCl on the I-II complex is discussed in terms of electrostatic repulsion.

IT 9003-20-7, properties

RL: PRP (Properties)

(interaction of, with **dodecyl sodium****sulfate**)

RN 9003-20-7 HCAPLUS

CN Acetic acid ethenyl ester, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 108-05-4

CMF C4 H6 O2

 $\text{AcO}-\text{CH}=\text{CH}_2$ 

IT 151-21-3, properties

RL: PRP (Properties)  
(interaction of, with **vinyl acetate**  
**polymers**)

RN 151-21-3 HCAPLUS

CN Sulfuric acid monododecyl ester sodium salt (8CI, 9CI) (CA INDEX NAME)

HO<sub>3</sub>SO- (CH<sub>2</sub>)<sub>11</sub>-Me

● Na

L48 ANSWER 27 OF 36 HCAPLUS COPYRIGHT 2000 ACS

AN 1970:91667 HCAPLUS

DN 72:91667

TI Interaction of **sodium dodecyl sulfate** with  
methyl cellulose and poly(vinyl alcohol)

AU Lewis, K. E.; Robinson, C. P.

CS Unilever Res. Lab., Port Sunlight, Engl.

SO J. Colloid Interface Sci. (1970), 32(3), 539-46

CODEN: JCISA5

DT Journal

LA English

AB The interactions in aq. soln. between **Na dodecyl**  
**sulfate** (I) and the **polymers** methyl cellulose and  
**poly(vinyl alc.)** and **vinyl alc.-**

**acetate** copolymer were studied by viscosity measurements and by  
the equil. dialysis method. The binding data, in the form of adsorption  
isotherms, show the existence of a crit. concn. of I below which no  
interaction with the **polymers** occurs. This is taken to be  
indicative of hydrophobic bonding. Other features of the isotherms are  
explained by the increasing I binding disrupting **polymer**  
aggregates which are known to be formed by methyl cellulose and  
**vinyl alc.-acetate** copolymer in aq. soln. In the case  
of the methyl cellulose-I system, abrupt changes in the viscosity of the  
solns. correlate with the binding data.

IT 151-21-3, properties

RL: PRP (Properties)

(interaction of, with cellulose methyl ether and vinyl alc. polymers)

RN 151-21-3 HCAPLUS

CN Sulfuric acid monododecyl ester sodium salt (8CI, 9CI) (CA INDEX NAME)

HO<sub>3</sub>SO- (CH<sub>2</sub>)<sub>11</sub>-Me

● Na

L48 ANSWER 28 OF 36 HCAPLUS COPYRIGHT 2000 ACS

AN 1969:525206 HCAPLUS

DN 71:125206

TI Vinyl ester polymer or copolymer hydrolyzate

IN Sato, Kenji

PA Kurashiki Rayon Co., Ltd.

SO Japan., 4 pp.

CODEN: JAXXAD

DT Patent

LA Japanese

FAN.CNT 1

PATENT NO.

KIND DATE

APPLICATION NO. DATE

PI JP 44021340 B4 19690911 JP 19650527  
 AB **Vinyl acetate** (I) or formate is emulsion  
**polymd.** or copolymd., extd. with PhMe, CCl<sub>4</sub>, or ClCH<sub>2</sub>CH<sub>2</sub>Cl, and  
 the ext. hydrolyzed with addn. of MeOH or EtOH. Thus, I 100 in H<sub>2</sub>O 100  
 parts was copolymd. with 75 kg./cm.<sup>2</sup> C<sub>2</sub>H<sub>4</sub> at 60.degree. with addn. of  
 (NH<sub>4</sub>)<sub>2</sub>S<sub>2</sub>O<sub>8</sub> 5, Na<sub>3</sub>PO<sub>4</sub> 4, and **Na lauryl sulfate**  
 17 in H<sub>2</sub>O 200 parts and steam distd. to give an emulsion of 93 parts 1:1  
 I-C<sub>2</sub>H<sub>4</sub> copolymer in 200 parts H<sub>2</sub>O. The emulsion was stirred with 400  
 parts PhMe and 120 parts **Na<sub>2</sub>SO<sub>4</sub>**. 10H<sub>2</sub>O at 60.degree. and the org.  
 layer evapd. to 60% solids and dild. with MeOH to 40% concn. Alk.  
 hydrolysis gave 97% copolymer hydrolyzate.

L48 ANSWER 29 OF 36 HCAPLUS COPYRIGHT 2000 ACS

AN 1969:439565 HCAPLUS

DN 71:39565

TI Interaction between polymer and detergent in aqueous solution

AU Arai, Haruhiko; Horin, Shoji

CS Household Goods Res. Lab., Kao Soap Co., Ltd., Tokyo, Japan

SO J. Colloid Interface Sci. (1969), 30(3), 372-7

CODEN: JCISA5

DT Journal

LA English

AB The interaction between **Na dodecyl sulfate**

(I) and **poly(vinyl acetate)** (II) derivs.,

i.e., **poly-(vinyl alc.)**, **poly(vinyl**

**acetate)**, and partially sapond. **poly(vinyl**

**acetate)**, was studied in terms of the solubilization of Yellow-OB,

viscosity, and dialysis equil. The amt. of solubilized Yellow-OB

decreases with the decreasing hydrophobic character of the **polymer**

. On the other hand, it can be expected that the reduced viscosity of

**polymer-I** and the amt. of adsorbed I on the **polymer**

takes on a max. value at some most suitable degree of sapon. of II. The

state of the **polymer**-detergent complex in detergent soln. is

discussed as a function of the hydrophobic character of the

**polymer.**

IT 9003-20-7, reactions

RL: RCT (Reactant)

(hydrolyzed, interaction with **dodecyl sodium**

**sulfate** in aq. soln.)

RN 9003-20-7 HCAPLUS

CN Acetic acid ethenyl ester, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 108-05-4

CMF C4 H6 O2

AcO-CH=CH<sub>2</sub>

RL: RCT (Reactant)

(with **dodecyl sodium sulfate** in aq. soln.

IT 151-21-3, reactions

RL: RCT (Reactant)

(with **vinyl acetate** deriv. **polymers** in

aq. soln.)

RN 151-21-3 HCAPLUS

CN Sulfuric acid monododecyl ester sodium salt (8CI, 9CI) (CA INDEX NAME)

HO<sub>3</sub>SO- (CH<sub>2</sub>)<sub>11</sub>-Me

Na

L48 ANSWER 30 OF 36 HCAPLUS COPYRIGHT 2000 ACS  
 AN 1968:106269 HCAPLUS  
 DN 68:106269  
 TI Interaction of surface-active agents with macromolecules  
 AU Saito, Shuji  
 CS Momotani Juntanken Co., Ltd., Osaka, Japan  
 SO Yukagaku (1968), 17(3), 176-83  
 CODEN: YKGKAM  
 DT Journal  
 LA Japanese  
 AB Interaction of ionic surface-active agents with linear high-mol.-wt. **polymers** in aq. solns., elec. conductance of Na ions in an aq. soln. of **poly**(ethylene oxide) and **Na dodecyl sulfate**, activity coeff. of Na ion in aq. solns. of **poly**(**vinyl acetate**) and **Na dodecyl sulfate**, viscosity systems, soly. of sodium hexadecyl sulfate in **poly**(**vinyl alc.**), effect of lyophobic group on the interaction of surfactants with **polymers**, and interactions of non-ionic surfactants with **polymers** in water, were reviewed with 54 references.  
 IT 9003-20-7, properties  
 RL: PRP (Properties)  
 (activity coeff. of sodium ion in **dodecyl sodium sulfate** soln. in aq.)  
 RN 9003-20-7 HCAPLUS  
 CN Acetic acid ethenyl ester, homopolymer (9CI) (CA INDEX NAME)  
 CM 1  
 CRN 108-05-4  
 CMF C4 H6 O2

AcO-CH=CH<sub>2</sub>

IT 151-21-3, properties  
 RL: PRP (Properties)  
 (in aqueous polymer solns.)  
 RN 151-21-3 HCAPLUS  
 CN Sulfuric acid monododecyl ester sodium salt (8CI, 9CI) (CA INDEX NAME)

HO<sub>3</sub>SO- (CH<sub>2</sub>)<sub>11</sub>-Me

Na

L48 ANSWER 31 OF 36 HCAPLUS COPYRIGHT 2000 ACS  
 AN 1968:105564 HCAPLUS  
 DN 68:105564  
 TI Emulsion **polymerization** of **vinyl acetate**.  
 I. Emulsion **polymerization** with **sodium dodecyl sulfate**

AU Breitenbach, Johann W.; Edelhauser, Helmut; Hochrainer, R.  
 CS Univ. Wien, Vienna, Austria  
 SO Monatsh. Chem. (1968), 99(2), 625-34  
 CODEN: MOCHAP  
 DT Journal  
 LA German  
 AB Emulsion **polymn.** of **vinyl acetate** using  
**Na dodecyl sulfate** as emulsifier and K  
 persulfate and .alpha.,.alpha.'-azobis(methylbutyronitrile-.gamma.-Na  
 sulfonate) as initiators was studied. The **polymn.** rate varies  
 with the 0.7 power of initiator concn. and shows practically no dependence  
 on emulsifier concn. in the range investigated (0.01 to 0.08m). Some  
 values of viscosity nos. of **polymers** obtained and of sizes of  
 latex particles are reported. The interaction between emulsifier mols.  
 and latex particles and the distribution of emulsifier between aq. phase  
 and **polymer** was investigated and compared to similar styrene  
 systems.  
 IT **151-21-3**, uses and miscellaneous  
 RL: USES (Uses)  
 (as emulsifier in **polymn.** of **vinyl acetate**  
 )  
 RN 151-21-3 HCAPLUS  
 CN Sulfuric acid monododecyl ester sodium salt (8CI, 9CI) (CA INDEX NAME)

HO<sub>3</sub>SO- (CH<sub>2</sub>)<sub>11</sub>-Me

● Na

IT **9003-20-7P**, preparation  
 RL: PREP (Preparation)  
 (catalysts for, dipotassium peroxydisulfate and disodium  
 3,3'-azobis[3-cyano-1-butanedisulfate] as, in emulsions)  
 RN 9003-20-7 HCAPLUS  
 CN Acetic acid ethenyl ester, homopolymer (9CI) (CA INDEX NAME)  
 CM 1  
 CRN 108-05-4  
 CMF C4 H6 O2

AcO-CH=CH<sub>2</sub>

L48 ANSWER 32 OF 36 HCAPLUS COPYRIGHT 2000 ACS  
 AN 1968:96347 HCAPLUS  
 DN 68:96347  
 TI Polymerization catalyst composition based on monoperoxyarbonates  
 IN Paridon, Leo J.  
 PA Pittsburgh Plate Glass Co.  
 SO Brit., 8 pp.  
 CODEN: BRXXAA  
 DT Patent  
 LA English  
 FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	GB 1105134		19680306	GB	19650302

AB .alpha.-Olefins are **polymd.** in the presence of OO-tertiary  
 alkyl-O-alkyl monoperoxyarbonates and a dialkyl peroxide or a mixt. of an  
 alkyl hydroperoxide and a dialkyl peroxide. Thus, 77 lb. iso-Pr

chloroformate and 81 lbs. of a mixt. contg. tert-BuOOH 72, tert-Bu2O2 25, and water 3% was cooled to 10.degree., stirred 1 hr. at this temp. with addn. of 104 lbs. 25 wt. % aq. NaOH, and stirred 30 min. The org. layer was mixed with 20 lbs. **Na2SO4**, stirred 30 min., and filtered to give 108 lbs. contg. OO-tert-butyl-O-isopropyl monoperoxycarbonate (I) 90, tert-Bu2O2 8.5, and tert-BuOOH 0.9 wt. %. A soln. of 0.05 g. of this product in 100 g. **vinyl acetate** was prepd. and **polymd.** at 60.degree. to give a yellow **polymer**. A mixt. contg. 100 g. styrene, 0.02 g. of an 80:20 I-tert-Bu2O2 mixt., 5 g. **Na lauryl sulfate**, and 195 g. water was heated 4 hrs. at 80.degree. to give a product emulsion contg. 30 wt. % of the original monomer. After 8 hrs. **polymn.** at 80.degree., the emulsion contained 18% of the original monomer. Similar results were obtained by replacing I with OO-tert-amyl-O-isopropyl monoperoxycarbonate and OO-tert-butyl-O-octyl monoperoxycarbonate.

IT 9003-20-7P, preparation

RL: IMF (Industrial manufacture); PREP (Preparation)

(manuf. of, catalysts for, dialkyl peroxycarbonates and peroxy compds. as)

RN 9003-20-7 HCAPLUS

CN Acetic acid ethenyl ester, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 108-05-4

CMF C4 H6 O2

AcO-CH=CH2

L48 ANSWER 33 OF 36 HCAPLUS COPYRIGHT 2000 ACS

AN 1968:79174 HCAPLUS

DN 68:79174

TI Platisols

IN Corso, Calogero

PA "Montecatini" Societa Generale per l'Industria Mineraria e Chimica

SO Ger., 4 pp.

CODEN: GWXXAW

DT Patent

LA German

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
DE 1261321		19680215		
IT		19600314		

PI DE 1261321 19680215

PRAI IT 19600314

AB Platisols with improved stability are prepd. by **polymg.** **vinyl chloride** (I) or mixts. of I and acrylonitrile, acrylate, methacrylate, **vinyl acetate**, **vinyl stearate**, vinylidene chloride, styrene, or .alpha.-methylstyrene in an aq. emulsion in a 2-step process, the 1st taking place at 45-50.degree. and the 2nd at 60-5.degree.. Thus, a reaction vessel was charged with 8400 l. water, 3700 l. I, 95 g./l. **lauryl Na sulfate** (on water), 4 g./l. cetyl alc., 3 g./l. stearyl alc. 0.08% azobisisobutyronitrile, and 0.2% NaHCO3. The **polymn.** was carried out for 14 hrs. at 46.degree. and an addnl. 6 hrs. at 65.degree.. Unreacted monomer was removed and the product dried. Platisols were prepd. by mixing 3:2 **poly**(vinyl chloride) (II)-bis(2-ethylhexyl) phthalate. Evaluation of the rheological properties of the above plastisol with one prepd. from II obtained by a 1-step **polymn.** at 46.degree. showed the 2-step material to be much superior.

L48 ANSWER 34 OF 36 HCAPLUS COPYRIGHT 2000 ACS

AN 1968:41342 HCAPLUS

DN 68:41342

TI Improvement of the water solubility of anionic surface-active agents  
 IN Maruta, Iwao; Tokiwa, Fumikatsu; Kusui, Nobuko; Nakatani, Hajime  
 PA Kao Soap Co., Ltd.  
 SO Jpn. Tokkyo Koho, 2 pp.  
 CODEN: JAXXAD  
 DT Patent  
 LA Japanese  
 FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 42017181	B4	19670911	JP	19630515
AB	The water sol. of anionic surface-active agents is improved by mixing 100 parts anionic surface-active agent with 3-100 parts vinyl <b>polymer</b> and dissolving in water. Thus, 7 g. <b>poly(vinyl acetate)</b> and 100 cc. 15% <b>Na dodecyl sulfate</b> (I) aq. soln. were stirred at 60.degree. for 18 hrs. to give a viscous soln. which was stable at -2.degree. for 10 days. Without <b>poly(vinyl acetate)</b> , 15% I aq. soln., on standing overnight, gave a large amt. of ppt.				
IT	<b>151-21-3</b> , properties RL: PRP (Properties) (soly. increase of, in water by <b>vinyl acetate polymers</b> )				
RN	151-21-3 HCAPLUS				
CN	Sulfuric acid monododecyl ester sodium salt (8CI, 9CI) (CA INDEX NAME)				

HO<sub>3</sub>SO- (CH<sub>2</sub>)<sub>11</sub>-Me

● Na

IT **9003-20-7**, uses and miscellaneous  
 RL: USES (Uses)  
 (surfactant (anionic) soly. increase in water by)  
 RN 9003-20-7 HCAPLUS  
 CN Acetic acid ethenyl ester, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 108-05-4  
 CMF C4 H6 O2

AcO-CH=CH<sub>2</sub>

L48 ANSWER 35 OF 36 HCAPLUS COPYRIGHT 2000 ACS  
 AN 1967:517678 HCAPLUS  
 DN 67:117678  
 TI Heat-stable poly(vinyl chloride) resins  
 IN Sugimoto, Katsumi  
 PA Japanese Geon Co., Ltd.  
 SO Jpn. Tokkyo Koho, 4 pp.  
 CODEN: JAXXAD  
 DT Patent  
 LA Japanese  
 FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 42016062	B4	19630902	JP	19630718
AB	Vinyl chloride (I) or its mixt. with copolymerizable monomers is <b>polymd.</b> with 0.5-2% monoolefins contg. 3 or more C atoms in the				

presence of diisobutyl (II) or dilauryl peroxypercarbonate, (C12C6H3CO)2O2, or [iso-BuCMe(CN)N:]2 to give the title resins. Thus, a mixt. of I 342, cis-butene 7, partially sapon. poly(vinyl acetate) 1.5, lauryl Na sulfate 0.5, and H2O 1170 parts was polymd. at 46.degree. with 0.3 part II to give 80% colorless resin (III) in 18.5 hrs., while (C11H23CO)2O2 instead of II yielded 62% yellowish resin in 36 hrs. and its 1-mm. sheet turned brown at 180.degree. in 4 hrs. as compared with 5.5 hrs. for III. 1-Butene or iso-butylene instead of cis-butene also gave heat-stable resins, but C2H4 was ineffective.

L48 ANSWER 36 OF 36 HCAPLUS COPYRIGHT 2000 ACS

AN 1967:491394 HCAPLUS

DN 67:91394

TI Solubilization of vinyl polymers

IN Maruta, Iwao

PA Kao Soap Co., Ltd.

SO Jpn. Tokkyo Koho, 4 pp.

CODEN: JAXXAD

DT Patent

LA Japanese

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 42009014	B4	19670501	JP	19630309

AB Poly(vinyl acetate) (I), poly(vinyl acetal) (II), or polyacrylates are solubilized with an anionic surfactant in a H2O-miscible org. solvent. Use of the org. solvent instead of H2O promotes complex micelle formation and reduces the soln. viscosity. Thus, a com. Na dodecyl sulfate was treated with MeOH and clarified from Na2SO4 to give a 10% soln. I (d.p. 1000) (3 g.) was dissolved in 100 g. of the soln. and poured into 20 vols. H2O to give a clear soln., while a soln. in neat MeOH gave a ppt. on diln. Similarly, 10 g. poly(dodecyl acrylate) in 100 cc. tetrahydrofuran was treated with 20 g. 1:1 oleate and resinate soap in 100 cc. HCONMe2; on diln. with 10 vols. H2O, a clear soln. formed. Resinate soap alone or Na tetradecanesulfonate was also effective for II or partially sapon. I (in 80% aq. MeOH), resp.

IT 9003-20-7, uses and miscellaneous

RL: USES (Uses)

(solubilization of, with anionic surfactants in solvents)

RN 9003-20-7 HCAPLUS

CN Acetic acid ethenyl ester, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 108-05-4

CMF C4 H6 O2

AcO-CH=CH2

=> fil uspat

FILE 'USPATFULL' ENTERED AT 07:29:06 ON 17 NOV 2000

CA INDEXING COPYRIGHT (C) 2000 AMERICAN CHEMICAL SOCIETY (ACS)

FILE COVERS 1971 TO PATENT PUBLICATION DATE: 14 Nov 2000 (20001114/PD)

FILE LAST UPDATED: 14 Nov 2000 (20001114/ED)

HIGHEST PATENT NUMBER: US6148441

CA INDEXING IS CURRENT THROUGH 14 Nov 2000 (20001114/UPCA)

ISSUE CLASS FIELDS (/INCL) CURRENT THROUGH: 14 Nov 2000 (20001114/PD)

REVISED CLASS FIELDS (/NCL) LAST RELOADED: Jul 2000

PI US 5357636 19941025  
 AI US 1992-906829 19920630 (7)  
 DT Utility  
 EXNAM Primary Examiner: Crowder, Clifford D.; Assistant Examiner: Vanatta, Amy B.  
 CLMN Number of Claims: 20  
 ECL Exemplary Claim: 1  
 DRWN 7 Drawing Figure(s); 7 Drawing Page(s)  
 LN.CNT 4898  
 AB A flexible protective medical glove containing a non-liquid antiseptic composition and methods for its use are disclosed. The glove comprises a thin inner layer and a thin outer layer of material; preferably the outer layer is a more elastic and less plastic layer than the inner layer. A compartment between the layers of the glove is capable of providing a non-liquid antiseptic composition which comprises an antiseptic in a non-liquid composition. The non-liquid antiseptic composition may also contain a surface-active agent, an analgesic agent, a colorant, a vasoconstrictive agent, an odorant, or a viscosity-modifying agent. An object puncturing the glove wall can become coated with the non-liquid antiseptic composition and can automatically transfer some of the antiseptic composition from the glove onto the hand and into a hand wound should the object cause a wound; useful as an immediate preventative antiseptic treatment to help to decontaminate the hand and hand wound of infectious pathogens that may have been transferred there by the object. The treatment can help to protect a gloved individual such as a surgeon, a medical doctor, a health care worker, a law enforcement officer, a dentist or any worker whose work may place them at some risk of becoming contaminated through the hands by an infectious pathogen including the AIDS virus or hepatitis B virus.

TI Flexible protective medical **gloves** and methods for their use  
 SUMM There has been an obvious increase in the wearing of medical gloves in many health care work environments following adoption of the Universal Precautions Guidelines and following the epidemic growth of AIDS in the human population. Because it is not known with certainty exactly which work environments can harbor an infectious pathogen such as HIV, medical gloves are now routinely worn by many medical or public workers whenever they suspect they may be at risk of any kind of accidental infection by any infectious pathogen. The present invention may be usefully worn in many work environments and during many kinds of work. The work environments and kinds of work in which gloves in accordance with the present invention may be used include but are not limited to the following examples: hospitals, medical clinics, private doctor offices, emergency medical work, medical ambulance work, fire rescue work, medical practice areas involving AIDS patients, surgery, gynecology, human fertility work, urology, general medicine, pathology, epidemiology, microbiology, neurology, orthopedics, radiology, oncology, nursing, dentistry, podiatry, psychiatry, psychiatric hospitals, hospices, other medical practices and specialties, kidney dialysis centers, diagnostic medical imaging-testing and operations facilities, hospital emergency waiting rooms, emergency hospital ambulatory care, clinics for drug rehabilitation, donor organ and tissue preservation banks and labs, blood banks, blood testing and related analytical chemistry labs, sperm banks, sperm testing labs, basic and clinical medical research labs, medical instrument cleaning, sharpening and repair facilities, hospital patient rooms, hospital operating rooms, cleaning and maintenance work, hospital laundries, hospital cafeterias, other hospital patient food service work, hospital morgues, funeral homes and related work areas that study or handle dead human bodies and tissues, medical and public waste or garbage collection areas, disposal areas and containers for human blood and disposable medical utensils, work with blood products, urine products or any human body products, hospital trash and other disposable waste areas which might contain medical waste, work with sharp contaminated objects such as needles, syringes, **wires**, catheters, and intravenous sets, plastic and glass tubes and pipettes, glass slides, scalpel blades, and the like;

disposable medical instruments and work areas involved in surgical instrument handling, repair and cleaning, clothing and medical assist areas; areas of medical garbage removal and medical sanitation work, medical work in nursing or retirement homes, and cleaning or industrial operations in any building where there may be any risk of a pathogenic infection. Surgical gloves and/or examination gloves in accordance with the present invention may also be used in animal medicine and during general work with animals in research, on farms or ranches with animals, in veterinary and animal husbandry practices and pet stores, in work with zoo animals, and in similar work where there may be some risk of contact with an infectious pathogen. Gloves in accordance with the present invention may also provide useful protection from physical contact with infectious pathogens that may exist in potentially infectious, nonmedical technical areas, scientific areas and other work areas including but not limited to the following examples: industrial, military, or other research work that involves work with infectious pathogens used in molecular biology or molecular genetics, recombinant molecular genetics, fermentation and vaccine production; the facilities include any government, military, commercial, industrial, or biotechnological production, research and testing areas. Medical gloves in accordance with the present invention are also useful protective hand wear in areas or in work which may include but is not limited to the following examples: public and business building maintenance work and cleaning, outdoor public areas work, restaurant work, sports clubs, spas, health clubs, massage parlors, building rehabilitation and clean-up work; guard work in jails, prisons, and other criminal confinement facilities. Gloves in accordance with the present invention may be useful during travel in public or private vehicles used to provide surface, underground, water, underwater, air, aerospace or even outer space transport conceivably may harbor infectious pathogens.

DETD FIG. 2A, FIG. 2B, and FIG. 2C illustrate the function of the present invention when an object causes a glove puncture while the glove is being worn on a hand. In most instances, a glove in accordance with the present invention is thin-walled like a standard medical examination glove or like a standard surgical glove. Thus, a glove wall of the present invention is capable of being punctured by an object when it contacts the glove wall with sufficient force. For the present invention, the definition of a glove-puncturing object is meant to include objects capable of puncturing, tearing, penetrating, cutting, abrading, shredding, chopping, biting, or otherwise disrupting the physical integrity of the glove wall. The wounding of a gloved hand is a common accident with health care workers. The glove puncturing object may be blunt or sharp edged. Typical objects that may cause an accidental glove puncture include the following objects: hypodermic syringe needles, suture needles, other needles, glass fragments, sharp metal fragments, scalpel blades, mechanical devices, surgical instruments, medical instruments, blunt forceps, glass slides, glass capillary tubes, and accessory medical objects such as drill tips, chisels, saws, **wires** and other glass objects. The edge of the glove-puncturing object depicted in FIG. 2A, FIG. 2B, and FIG. 2C is sharp. However, a sharp object is depicted here only for illustrative purposes and is not meant to be a limiting example. The glove puncturing object may be a blunt-edged object. For any glove-puncturing object, the interactions between glove-puncturing object 6, glove layer 2, glove layer 3, non-liquid antiseptic composition 4 and hand 8 as illustrated in the figures, are expected to be similar as will become readily apparent from the following detailed description of these interactions.

DETD It is another object of the present invention to transfer a portion of coating 7 from object 6 for example, to the space between inner glove layer 3 and hand 8. In FIG. 2B, object 6 is puncturing inner glove layer 3 and thus has completely punctured the glove wall. If the non-liquid antiseptic composition is an essentially dry solid, a **granular**, a crystalline, a powder or the like dry composition, then coating 7 of non-liquid antiseptic composition on object 6 may deposit some of the dry composition in a small portion of the space between inner glove

layer 3 and hand 8. Fluid matter on object 6 may cause the dry non-liquid antiseptic composition to adhere to some degree on object 6. If the non-liquid antiseptic composition contains in part some liquid and/or the antiseptic is solvated to some extent, as occurs with a number of non-liquid compositions such as foams, pastes, gels, ointments, greases, bases and the like compositions, then coating 7 is more likely to smear, stick, film or provide an even or more complete coating on the puncturing surfaces of object 6; preferable as a means for allowing a portion of the non-liquid antiseptic composition to be transferred on object 6 from compartment 4 to the space between inner glove layer 3 and hand 8.

DETD To make a glove in accordance with the present invention which has an outer glove layer and an inner glove layer of similar elasticity and similar plasticity, similar materials forming these glove layers may be used and may comprise: (a) a structural material selected from the group consisting of latex rubber, cis-1,4-polyisoprene, cis-polybutadiene, neoprene rubber, nitrile rubber, silicone rubber, polychloroprene rubber, another halogenated rubber, a case-hardened rubber, another butadiene rubber, a cross-linked rubber, isobutylene-isoprene 1. butyl rubber, butadiene-acrylonitrile 1. nitrile rubber, styrene-butadiene rubber, ethylene-propylene copolymer, ethylene-propylene diene terpolymer, polyisobutylene, chlorosulphonated polyeten, ester-type urethan rubber, polychlormethyloxyran epichlorhydrin rubber, epichlorhydrin copolymer with ethyleneoxydichlormethyloxyran copolymer, another suitable rubber, cellulose **acetate** plastic, **vinyl** plastic, polyethylene plastic, polypropylene plastic, polyvinyl chloride plastic, **polyvinyl acetate** plastic, polystyrene plastic, **polymethyl** methyl-acrylate plastic, polyacrylonitrile plastic, vinylite plastic, saran plastic, polytetrafluoroethylene plastic, polytrifluoro-chloroethylene plastic, polycaprolactam plastic, polyester plastic, urea formaldehyde plastic, polyurethane plastic, isotactic polypropylene plastic, nylon plastic, rayon plastic, polyamide plastic, phenolic plastic, silicone plastic, another suitable plastic, silk fiber, suitable fiber from an animal secretion, cotton fiber, cellulose fiber, another suitable plant fiber, wool fiber, another suitable animal fiber, animal hair, animal skin, animal intestinal tissue, animal connective tissue, another suitable animal tissue, metal fiber, mineral fiber, another suitable synthetic fiber, and mixtures thereof; and (b) optionally a colorant selected from the group consisting of titanium oxide, an iron oxide, a dye and mixtures thereof. If structural materials are used that can form liquid permeable layers, then the wall structure may be coated or embedded with a liquid-impermeable material to make the glove structure layer liquid-impermeable.

DETD Alternatively, to make a glove in accordance with the present invention having an inner glove layer of lower elasticity and higher plasticity than the outer glove layer, the first material (which is used for the outer glove layer) may comprise an elastic structural material selected from the group consisting of latex rubber, cis-1,4-polyisoprene rubber, cis-polybutadiene rubber, neoprene rubber, nitrile rubber, silicone rubber, polychloroprene rubber, another halogenated rubber, a case-hardened rubber, another butadiene rubber, a cross-linked rubber, isobutylene-isoprene 1. butyl rubber, butadieneacrylonitrile 1. nitrile rubber, styrene butadiene rubber, ethylene-propylene copolymer, ethylene-propylene diene terpolymer, polyisobutylene, chlorosulphonated polyeten, ester-type urethan rubber, Polychlormethyloxyran epichlorhydrin rubber, epichlorhydrin copolymer with ethyleneoxydichlormethyloxyran copolymer, another suitable rubber and mixtures thereof; and optionally a colorant selected from the group consisting of titanium oxide, an iron oxide, a dye and mixtures thereof. The second material (used for the inner glove layer) may comprise: a plastic structural material selected from the group consisting of cellulose **acetate** plastic, **vinyl** plastic, polyethylene plastic, polypropylene plastic, polyvinyl chloride plastic, **polyvinyl acetate** plastic, polystyrene plastic, **polymethyl** methylacrylate plastic, polyacrylonitrile plastic,

vinylite plastic, saran plastic, polytetrafluoroethylene plastic, polycaprolactam plastic, polytrifluorochloroethylene plastic, nylon plastic, rayon plastic, polyester plastic, urea formaldehyde plastic, polyurethane plastic, isotactic polypropylene plastic, polyamide plastic, phenolic plastic, silicone plastic, another suitable plastic, silk fiber, another suitable fiber from an animal secretion, cotton fiber, another suitable plant fiber, wool fiber, another suitable animal fiber, animal hair, animal skin, animal intestinal and connective tissues, metallic fiber, mineral fiber, chemically-modified natural fibers, chemical-modified synthetic fibers another synthetic fiber, and mixtures thereof; and a colorant selected from the group consisting of titanium oxide, an iron oxide, a dye and mixtures thereof. Materials obtained from animal intestinal tissues and animal connective tissue may comprise the intestinal wall, ligaments, tendons and fascia and like tissue obtained from slaughtered farm or ranch animals including the following animals: cow, bull, sheep, steer, horse, chicken, goat, mink, rabbit, and pig. It is imagined that almost any animal may provide suitable raw materials for the glove.

DETD The non-liquid antiseptic composition comprises one or more antiseptics in a non-liquid composition. As mentioned previously, the non-liquid antiseptic composition may contain one or several liquid substances as components in the composition. The liquid(s) provided in the composition may have a number of functions for some embodiments of the present invention including an antiseptic function, or a solvent or a dispersant function useful during preparation of the non-liquid antiseptic composition or during use of the present invention. Low molecular weight liquids are particularly useful during the formation of the composition to help to solvate and to properly disperse/mix the colloids and **polymers** added to form the non-liquid antiseptic composition.

DETD The antiseptic used in some embodiments of the present invention may be selected from the group consisting of chlorhexidine gluconate, chlorhexidine acetate, chlorhexidine hydrochloride, chlorhexidine, other chlorhexidine salts, other hexamethylenebis biguanides, octoxynol, nonoxynol-9, methanol, ethanol, isopropanol, allyl alcohol, rubbing alcohol NF, sodium hypochlorite, potassium hypochlorite, calcium hypochlorite, magnesium hypochlorite, sodium dichloroisocyanurate, sodium perborate NF, sodium hydroxide, potassium hydroxide, magnesium hydroxide, calcium hydroxide, ammonia, ammonium hydroxide, lithium hydroxide, barium hydroxide, silver hydroxide, other metal hydroxides, sodium tetradecyl sulfate, sulfur dioxide, pentationic acid, colloidal sulfur, sulfated potash, sublimed tyrothricin, hexachlorophene, hypochlorous acid, other chlorophors, acetic acid, hydrochloric acid, sulfuric acid, sodium acetate, aluminum acetate, acetarsone, aluminum subacetate, cadmium sulfide, selenium sulfide, other metal sulfides, bacitracin, calomel, chiniofon, creosote, diiodohydroxyquin, eucalyptol, eucalyptus oil, glycobiarsol, gramicidin, hexyl resorcinol, methylene blue, peppermint oil, phenylethyl alcohol, phenyl salicylate, methyl salicylate, pine tar, pine oil NF, pine oil emulsion, tertiary terpene alcohols, secondary terpene alcohols, alpha-terpineol, borneol, fenchyl alcohol, o-methylchavicol, **polymixin B** sulfate, colistin, chloramphenicol, tetracycline, erythromycin, gentamycin, mafenide acetate, neomycin sulfate, sulfisoxazole diolamine, sulfacetamide sodium, gentamycin sulfate, amphotericin B, tobramycin, a penicillin, a cephalosporin, salicylic acid, trichloroacetic acid, benzoic acid, pyrogallol NF X, pyrogallol acid, sodium benzoate, boric acid, sodium borate, lactic acid, sodium lactate, chloramine, chloramine T, silver nitrate, ammoniacal silver nitrate solution, eugenol, elemental iodine, sodium iodide, potassium iodide, calcium iodide, ammonium iodide, silver iodide, colloidal silver iodide in gelatin, silver lactate, ferrous iodide, mercuric iodide red, mercuric oxide red, strontium iodide, lithium iodide, magnesium iodide, zinc iodide, silver iodide, selenium iodide, thymol iodide NF X, dithymol diiodide, iodinated derivatives of thymol, other iodide salts, povidone-iodine, iodoform, iodinated organic compounds, iodol, iodopyrrol, other iodophors, chlorinated lime, bromide salts, sodium bromide, merbromin NF, other bromophors, other brominated chemicals, sodium fluoride and other fluorinated chemicals and

fluorophors, Lysol, Nonidet P40, phenyl mercuric acetate, potassium mercuric iodide, proflavine hemisulfate, 3,6-diaminoacridine bisulfate, formaldehyde, glutaraldehyde, parsformaldehyde, butyl hydroxybenzoate, mercurous chloride, iodochlorhydroxyquin, zinc nitrate, zinc sulfate, cadmium sulfate, thimerosal NF, zinc oxide, zinc acetate, zinc chloride, silver nitrate, silver sulfadiazine, hydrogen peroxide, urea hydrogen peroxide, hydrogen peroxide carbamide, benzoyl peroxide, calcium peroxide, magnesium peroxide, barium peroxide, strontium peroxide, sodium peroxide, potassium perchlorite, sodium perchlorite, calcium perchlorite, magnesium perchlorite, zinc perchlorite, zinc peroxide, zinc carbonate, zinc hydroxide, zinc sulfate, succinyl peroxide, succinchlorimide NF IX, N-Chloro-succinimide, potassium permanganate, sodium chlorate, potassium chlorate, phenol, sodium phenolate, domiphen bromide, salicylic acid, bismuth-formic-iodide, bismuth subgallate, bacitracin zinc, **sodium lauryl sulfate**, carbamide peroxide, sodium borate, oleic acid-iodine, piperonyl butoxide, sodium peroxyborate monohydrate, ammonium ichthosulfonate, eucalyptol, menthol, Witch Hazel, camphor, tannic acid, camphorated phenol, phenol glycerin, chloroxylenol, 4-chloro- 3,5-xyleneol, chloroquinaldol, nalidixic acid, zinc phenol-sulfonate, zinc sulfocarbolate, hydroxynalidixic acid, pipemidic acid, norfloxacin, norfloxacin hydrochloride, other quinolones, 8-hydroxyquinoline sulfate, sodium phenolate, thyme oil, o-cresol, m-cresol, metacresylacetate, p-cresol, cresol NF, 4-chloro-m-cresol, 4-chloro-S,5-xyleneol, saponified cresol solution NF, methylphenol, ethyl phenol, other alkyl phenols, o-phenyl phenol, other aryl phenols, bis-phenols, phenyl-mercuric chloride, phenylmercuric borate, resorcinol, resorcinol monoacetate NF, orthophenylphenol, chloroxylenol, hexyl-resorcinol, parachlorophenol, paratertiary-amylphenol, thymol, chlorothymol NF, menthol, butylparaben, ethylparaben, methylparaben, propylparaben, triclosan, bithionol NF, o-benzyl-p-chlorophenol, hexachlorophene, poloxamer 188, benzalkonium chloride where the alkyl groups attached to the nitrogen represent any alkyl from CH.sub.3 to C.sub.18 H.sub.37, methylbenzethonium chloride, cetrimonium bromide, abikoviromycin, acetylenedicarboxamide, acetyl sulfamethoxypyrazine, triclobisium chloride, undecoylium chlorideiodine, coal tar solution, furazolidone, nifuroxime, nitrofurazone NF, nitromersol NF, oxychlorosene, sodium oxychlorosene, parachlorophenol NF, camphorated parachlorophenol NF, phenylmercuric nitrate NF, gentian violet USP, hexamethylpara-rosaniline chloride, rosaniline chloride, pentamethylpararosaniline chloride, methylrosaniline chloride, tetramethylpararosaniline chloride, nonylphenoxypolyethoxyethanol, methoxypolyoxyetheneglycol 550 laurate, oxyquinoline benzoate, p-triisopropylphenoxypolyethoxy-ethanol, halazone NF, dichloramine-T, benzethonium chloride, econazole, cetylpyridinium chloride, methylbenzethonium chloride, cetyldimethylbenzylammonium chloride, dichlorobenzalkonium chloride, domiphen bromide, triclocarban, clotrimazole, ciclopirox olamine, undecylenic acid, miconazole, tolnaftate, acriflavine, euflavine, 3,6-diamino-10-methylacridium chloride, 3,6-diamino-acridine, acid acriflavine, 5-aminoacridine hydrochloride monohydrate, malachite green G, dodecyltrimethylammonium bromide, tetradecyltrimethylammonium bromide, dequalinium chloride BP, dibromopropamide isethionite, hexadecyltrimethylammonium bromide, chloroazodin NF X, N-chloro-p-toluenesulfonamidosodium, 4-[(dichloroamino)sulfonyl]-benzoic acid, methenamine, methenamine mandelate, methenamine hippurate, octoxynol 9, phenazopyridine hydrochloride, 9-aminoacridine hydrochloride, bismuth tribromophenate, p-tert-butylphenol, cetyldimethylethylammonium bromide, chlorothymol, cloflucaban, chlorophene, chloroxine, 8-hydroxyquinoline, merbromin, mercuric oxide yellow, ammoniated mercury, p-tert-pentylphenol, phenylmercuric acetate, phenylmercuric nitrate, propylene oxide, zinc pyrithione, zinc bacitracin, chlortetracycline hydrochloride, calcium chlortetracycline, oxytetracycline hydrochloride, beta-propiolactone, acyclovir, acyclovir sodium, amantadine hydrochloride, cytarabine, idoxuridine, interferon, gamma interferon, ribavirin, rifampin, suramin, trifluridine, vidarabine, zidovudine, methisazone, tumor necrosis factor, ampicillin, ansamycin, (E)-5-(2-bromovinyl)-2'-deoxyuridine,

butylated hydroxytoluene, castamospermine, dextran sulfate, dideoxycytidine, dideoxyadenosine, dideoxyinosine, Peptide-T, dihydromethylpyridinylcarbonyloxyazidodideoxythymidine, ganciclovir, 2'-fluoro-2'-deoxy-5-iodo-ara C, phosphonoformate, rimantadine hydrochloride and the like and their derivatives and mixtures thereof. For optimal antiseptic activity, nonoxynol-9 is buffered to a pH between about 5.0 and about 4.0; preferably the pH may be about 4.5 in a non-liquid antiseptic composition containing nonoxynol-9.

DETD The non-liquid antiseptic composition may contain a liquid selected from the group consisting of water, methanol, ethanol, isopropanol, propanol, allyl alcohol, butanol, isobutanol, sec-butanol, tert-butanol, benzyl alcohol, nonxynol-9, n-octyl alcohol, 2-octyl dodecanol, other liquid alcohols, glycerol, propylene glycol, other liquid glycols, 1,2,6-hexanetriol, other liquid triols, polyethylene glycol of between about 150 to about 700 molecular weight, other liquid polyethylene glycols, other liquid glycols, other liquid triols, urea, other liquid amides, acetone, methyl ethyl ketone, ethyl ketone, methyl isopropyl ketone, 2-pentanone, ethyl acetate, ethyl propionate, ethyl butyrate, ethyl valerate, methyl acetate, propyl acetate, isopropyl acetate, butyl acetate, sec-butyl acetate, tert-butyl acetate, amyl acetate, pentyl acetate, isopentyl acetate, benzyl acetate, 2-methoxyethanol, 2-methoxyethyl acetate, 2-ethoxyethanol, 2-ethoxyethyl acetate, other liquid ketones except methyl n-butyl ketone, other liquid esters, other liquid aldehydes, formic acid, other liquid organic acids including liquid carboxylic acids, mineral oil, silicone oil, other chemically derived oils, hexamethyl disiloxane, other liquid silanes, glycerol trioctanoate, decyl oleate, cetearyl isononanoate, other liquid soaps, other liquid detergents, dimethicone, other liquid silicones, perfluoropolymethylisopropyl ether of about 1500 to about 6600 molecular weight, other liquid emulsifiers, olive oil, cottonseed oil, corn oil, soybean oil, wheat germ oil, linseed oil, pine oil, almond oil, macadamia oil, coconut oil, jojoba oil, peanut oil, persia oil, castor oil, other vegetable oils, other plant oils, cod liver oil, **shark** liver oil, mink oil, other animal oils, squalene, other liquid steroids, other suitable relatively non-toxic naturally occurring liquids, other suitable man-made liquids, and the like and mixtures thereof.

DETD It may be useful to include at least one surface active agent in the non-liquid antiseptic composition to facilitate the coating of the glove-puncturing object with the non-liquid antiseptic composition. The surface active agent may be selected from the group consisting of dodecyltrimethylamine oxide, lauryldimethylamine oxide, other similar oxides, stearic acid, dibutyl adipate, octyl stearate, octyl alcohol, sodium cetearyl stearate, isopropyl myristate, palmitic acid, other fatty acids, stearyl alcohol, colloidal magnesium aluminum silicate, colloidal silicon dioxide, other mineral colloids, caprylic triglyceride, capric triglyceride, decyl-beta-D-glucopyranoside, cetostearyl alcohol, nonyl-beta-D-glucopyranoside, octyl-beta-D-glucopyranoside, magnesium stearate, calcium stearate, potassium stearate, aluminum stearate, zinc stearate, triethanolamine stearate, other stearates, **sodium lauryl sulfate**, heptyl-beta-D-glucopyranoside, hexyl-beta-D-glucopyranoside, dodecyl-beta-D-maltoside, decyl-beta-D-maltoside, **sodium dodecylsulfate**, sodium oleate, potassium laurate, sodium laurate, **sodium lauryl sulfate**, glycerol monostearate, propylene glycol monostearate, other fatty acid esters, bis(2-ethylhexyl)sodium sulfosuccinate, propylene glycol monolaurate, N-dodecyl-sulfatobetaine, octyl-beta-D-thiogluco-pyranoside, heptyl-beta-D-thiogluco-pyranoside, N-dodecyl-N,N-dimethyl-glycine, cetyl alcohol, N-decylsulfatobetaine, digitonin, 1,2,6-hexanetriol, N-hexadecylsulfatobetaine, N-tetradecylsulfatobetaine, dioctyl sodium sulfosuccinate, N,N-bis(3-D-gluconamidopropyl)-cholamide, sodium deoxycholate, N,N-bis(3-D-gluconamidopropyl)-deoxycholamide, glycerol monostearate, N-octylsulfobetaine, sodium taurodeoxycholate, sodium cholate, sodium taurocholate, sodium glycocholate, other steroids, cetyltrimethylammonium bromide, 3-[(3-cholamidopropyl)dimethyl

ammonio]-1-propanesulfonate, 3-[(3-cholamidopropyl)dimethylammonio]-2-hydroxypropane-1-sulfonate, octanoyl-N-methylglucamide, nonanoyl-N-methylglucamide, decanoyl-N-methylglucamide, nonyl-N-methylglucamide, lecithin, lysolecithin, nonaethylene glycol monododecyl ether, nonaethylene glycol octylphenol ether, nonaethylene glycol octylcyclohexyl ether, heptaethylene glycol octylphenyl ether, heptaethylene glycol octylcyclohexyl ether, polyoxyethylene (10) monolauryl ether, polyoxyethylene (8) isotridecyl ether, polyoxyethylene (10) isotridecyl ether, polyoxyethylene (15) isotridecyl ether, polyoxyethylene (9) lauryl ether, polyoxyethylene (23) lauryl ether, octaethylene glycol monododecyl ether, nonaethylene glycol monododecyl ether, other ethers, polyethylene polypropylene glycol, sorbitan monopalmitate, sorbitan monooleate, sorbitan monostearate, polyoxyethylene sorbitan monolaurate, polyoxyethylene sorbitan monooleate, other sorbitans, polyoxyethylene-4-lauryl ether, polyethylene glycol 400 monostearate, polyoxyethylene-4-sorbitan monolaurate, Polyoxyethylene-20-sorbitan monooleate, polyoxyethylene-20-sorbitan monopalmitate, polyoxyethylene-20-sorbitan monolaurate, polyoxyethylene-40-stearate, dimethicone, simethicone, dimethylpolysiloxane, other siloxanes, sorbitan trioleate, sorbitan tristearate, propylene glycol monostearate, sorbitan sesquioleate, diphenyl-methylsilicone, lauryldimethylbenzylammonium chloride, a perfluoropolymethylisopropyl ether of about 1500 to about 6600 molecular weight, acacia, type A gelatin, type B gelatin, egg yolk phospholipids, soybean phospholipids, other lipids, cholesterol, colloidal aluminum silicate, colloidal magnesium hydroxide, stearic acid, methylparaben, propylparaben, other suitable surface active chemical agents and the like and their derivatives and mixtures thereof.

DETD The non-liquid antiseptic composition may contain an algesic agent that is capable of increasing the pain sensation that can be felt by a hand when the hand has been wounded by a glove-puncturing object, as a means for rapidly alerting the glove-wearing individual. The algesic agent may be selected from the group consisting of formic acid, acetic acid, citric acid, sodium hydrogen citrate, other acidic citrate salts, other organic acids, phosphoric acid, sodium hydrogen phosphate, sodium phosphate, potassium hydrogen phosphate, other acidic phosphate salts, other phosphate salts, hydrochloric acid, sulfuric acid, sodium hydrogen sulfate, **sodium sulfate**, other acidic salts, other mineral acids, sodium hypochlorite, potassium hypochlorite, other hypochlorite salts, bradykinin, substance P, bee venom, wasp venom, ant venom, other suitable algesic peptides, algesic proteins, algesic ionophores, potassium chloride, potassium citrate, potassium sulfate, potassium phosphate, potassium carbonate, potassium bromide, potassium iodide, potassium fluoride, potassium hydroxide, potassium nitrate, other potassium salts, other potassium containing chemicals, other algesic organic chemicals, other algesic salts, and the like and mixtures thereof. The above algesic agents may also be capable of providing an acidifying function for some embodiments of the present invention which can enhance the antiseptic activity by providing a source of protons, by lowering the pH of the composition or by other means.

DETD The non-liquid antiseptic composition can contain a viscosity-modifying agent such as a **polymer** or a highly-branched molecule of high molecular weight, useful as a means for increasing the viscosity of the non-liquid antiseptic composition so that the composition is prevented from flowing as a liquid until contact may be made with a hand or a hand wound as a result of a glove puncture. The viscosity-modifying agent may bind, associate, solvate with or otherwise complex with liquid solvent molecules in the antiseptic composition and can thereby lower the effective solvent concentration in the antiseptic composition. The final viscosity of the non-liquid antiseptic composition may exceed 5000 centipoise at normal glove temperatures which are generally expected to range between about 10.degree. C. to about 42.degree. C. However, some of the non-liquid antiseptic compositions used in the present invention may have a viscosity below 5000 centipoise; an example would be a foam-forming or foam-type, non-liquid antiseptic composition.

DETD The viscosity-modifying **polymer** or agent may be selected from the group consisting of xantham gum, gum acacia, gum tragacanth, agar, glycyrrhiza, polyvinylpyrrolidone **polymers** having an average molecular weight between about 500 to about 5000 grams/mole, cross-linked polyvinylpyrrolidone **polymers**, sodium alginate NF, pectin NF from citrus fruit or apple pomace, other plant gums, theobroma oil (also known as cacao butter or cocoa butter), cellulose, methyl cellulose (Methocel, trademark of Dow Chemical Co.) carboxymethylcellulose (CMC) sodium, hydroxyethyl cellulose (Cellosize, trademark of The Carbide and Carbon Chemicals Corp.), hydroxpropylmethylcelluloses designated Methocel 60, HG, Methocel HG65, Methocel HG70, Methocel HG90 (wherein the number refers to the approximate gel point of a 2 percent solution), other alkylated celluloses including ethylcellulose, hydroxyethyl cellulose, propylcellulose, microcrystalline cellulose (Avicel PH, trademark of FMC Corporation, Philedelphia, Pa.), other suitable chemically-modified celluloses, glycerol, propylene glycol, pyroxylin, polyethylene glycols of between about 150 to more than about 6000 molecular weight, polyethylene glycol 400, polyethylene glycol 4000, polyethylene glycol 4000, polyethylene glycol 6000, gelatin A, gelatin B, glycinerated gelatin, wool fat, beeswax, White petrolatum USP, Petrolatum NF (Petroleum Jelly with a melting point of 42.degree.-60.degree. C.), Plastibase (tradename "Plastibase" from E.R. Squibb & Co., also called Jelene: a combination of mineral oils and heavy hydrocarbon waxes with a molecular weight of about 1300), **anhydrous** lanolin USP, microcrystalline wax, cholesterol, white wax, hard paraffin wax, yellow soft paraffin wax, white soft paraffin wax, **sodium lauryl sulfate**, stearyl alcohol, carbowax polyethylene glycol 1000, carbowax polyethylene glycol 1500, carbowax polyethylene glycol 1540, carbowax polyethylene glycol 4000, carbowax polyethylene glycol 6000, other proteins, dimethicones including those more than 1000 centistokes in viscosity, simethicone, dtmethylpolysiloxane, perfluoropolymethylisopropyl ethers of 1000 to more than 6600 molecular weight, starch, other alkylated starches, other chemically-modified starches, bentonite USP, sodium bentonite, potassium bentonite, calcium bentonite, magnesium bentonite, hydrogen bentonite, Voloclay bentonite (a combination of sodium bentonite, potassium bentonite, calcium bentonite, magnesium bentonite, and hydrogen bentonite), attapulgate (a hydrous magnesium aluminum silicate that is heat-activated), Veegum (a colloidal magnesium aluminum silicate), carbopol 934 at neutral pH (a trademark acidic **polymer** of B.F. Goodrich Chemical Co.), benzoinated lard, guar gum, agar, pulverized natural sponge, potato starch, corn starch, other vegetable starches, other plant cellulose fibers, other plant or mineral fibers or **polymers**, other synthetic **polymers** and mixtures thereof. It is useful to include the forementioned viscosity-modifying **polymers** when making compound non-liquid antiseptic compositions such as for example gels, foams, pastes, puttys, greases, and the like and mixtures thereof. The viscosity-modifying **polymer** help to prevent the antiseptic composition from flowing like a liquid from the glove punture in an uncontrolled manner. Certain **polymers** such as starch or povidone or other molecules may complex iodine or other antiseptics and buffer their free concentration in the non-liquid antiseptic composition. This effect may need to be taken into account when formulating the non-liquid antiseptic composition.

DETD A **glue** or any other connecting means or device may be used to seal or close compartment 4 at the open end of the glove layers. A **glue** can be used which is capable of suitably bonding rubber, plastic or any other glove layer materials forming the glove wall. The cured **glue** should not be solubilized nor weakened by contact with the non-liquid antiseptic composition. The preferred sealing **glue** may contain a silicone, an epoxy **polymer**, an epoxy resin, a cyanoacrylate, a cyanomethylacrylate, and the like, or any other effective **glue** or bonding agent that remains suitable in the presence of a particular non-liquid antiseptic composition. For example, one suitable commercially-available silicone

rubber cement for bonding rubber to rubber or to plastic is Archer Brand Silicone Rubber Cement (Radio Shack, Fort Worth, Tex., 76102) which contains methyltriacetoxysilane (CAS 004253343), ethyltriacetoxysilane (CAS 017689779), polydimethylsiloxane, and silica (CAS 007631869).

DETD

(a) a structural material selected from the group consisting of latex rubber, cis-1,4-polyisoprene rubber, cis-polybutadiene rubber, neoprene rubber, nitrile rubber, silicone rubber, polychloroprene rubber, another halogenated rubber, a case-hardened rubber, another butadiene rubber, a cross-linked rubber, isobutylene-isoprene 1. butyl rubber, butadieneacrylonitrile 1. nitrile rubber, styrene-butadiene rubber, ethylene-propylene copolymer, ethylene-propylene diene terpolymer, polyisobutylene, chlorosulphonated polyeten, ester-type urethan rubber, polychlormethyloxyran epichlorhydrin rubber, epichlorhydrin copolymer with ethyleneoxydichlormethyloxyran copolymer, another rubber, cellulose

**acetate** plastic, **vinyl** plastic, polyethylene plastic,

polypropylene plastic, polyvinyl chloride plastic, **polyvinyl**

**acetate** plastic, polystyrene plastic, **polymethyl**

methylacrylate plastic, polyacrylonitrile plastic, vinylite plastic,

saran plastic, polytetrafluoroethylene plastic,

polytrifluorochloroethylene plastic, nylon plastic, rayon plastic,

polycaprolactam plastic, polyester plastic, urea formaldehyde plastic,

polyurethane plastic, isotactic polypropylene plastic, polyamide

plastic, phenolic plastic, silicone plastic, another plastic, another

synthetic organic fiber, silk fiber, another suitable fiber from an

animal secretion, cotton fiber, another plant fiber, wool fiber, another

animal hair, leather, another animal fiber, animal skin, animal

intestinal tissue, animal connective tissue, metallic fiber, mineral

fiber, a **glue** comprising one or more of the forementioned

structural materials, and mixtures thereof; and

DETD

Case hardened rubber may be used in the present invention when a surface of a rubber wall or structural element of the glove may need to have increased resistance to chemical solvents, to the antiseptic and to other substances provided in the present invention. Case-hardening rubber includes using processes that chemically cross-link and strengthen the rubber **polymer** molecules on the surface of the rubber. In general, synthetic elastomer structural materials may be formed by **polymerizing** monomeric molecules by an emulsion or solution **polymerization** process. It is known that the rubber

**polymers** formed may additionally contain a curing agent such as

sulfur or a peroxide to cross-link the rubber molecules. Sulfur may be

used to crosslink diene containing elastomers while a peroxide is used

to crosslink a saturated **polymer**. It is also known to use an

accelerator such as for example an amine derivative, an aldehyde-amine

condensation product, a thiazole, a dithiocarbamate, a guanidine

derivative, a thiuram, a xantate or a xantogenate to promote the

reaction between the sulphur and the rubber molecules because this

reaction is otherwise quite slow. It is also known to use a metal oxide

activator to make the accelerator more effective sometimes with an

organic acid such as stearic acid. The rubber may further contain an

antioxidant such as an amine or phenol derivative, a filler for

reinforcement or for coloration. The rubber may contain a plasticizer or

a softener such as an ester, an adipate, phthalate, silicate, stearate,

phosphate, or mineral oil. The use of a plasticizer or softener in the

non-liquid antiseptic composition may be used to help to maintain the

softness or plasticity of the rubber glove wall, but an excess amount of

the softener or the plasticizer may unsuitably modify the rubber wall

properties particularly with latex rubber gloves. When the non-liquid

antiseptic composition contains a softener such as mineral oil and a

glove wall is rubber, preferably the rubber wall is made of solvent

resistant rubber such as for example neoprene or a cross-linked rubber.

A resin(s) or a rosin(s) may be added to make the rubber tacky or gummy.

A typical rubber formulation may contain the following material

composition: 100 parts of elastomers, 1-4 parts of fillers, 0.5-2 part

of stearic oils, 2-5 parts of zinc oxide, 1-12 parts of plasticizing

oils, 1-3 parts of accelerators, 0.5-4 parts of antioxidants, 0-10 parts

of resins, and 1-3 parts of sulphur. Infared or ultraviolet light may be

used to increase the case-hardening, crosslinking and related chemical production of the rubber used in the present invention.

DETD

It is another object of the present invention to provide a glove having a plurality of glove layers acting as a structural connection which reconfigures the compartment storing the non-liquid antiseptic composition into a plurality of compartments (or subcompartments) storing some or all of the components capable of forming the non-liquid antiseptic composition. For some embodiments of the present invention, it is conceivable that the chemical composition of the non-liquid antiseptic composition may be more stable, potent or otherwise more suitable when some of the components of the composition are physically stored separately in the glove from the other substances of the antiseptic composition until as needed, namely when the glove wall may be punctured or otherwise damaged. Thus, any of the forementioned liquid or solid substances that may be used in the non-liquid antiseptic composition may be separately stored in the present invention; for example an antiseptic, a liquid, a viscosity modifying **polymer**, an analgesic, a colorant, a vasoconstrictor, or any of other components or substances that may comprise the non-liquid antiseptic composition can be stored in separate compartments or locations within the glove wall as deemed desirable. Separate locations for the substances in the glove may for example be useful for enhancing the storage life of the glove, may increase antiseptic potency, may increase the antiseptic breadth of spectrum of antiseptic action, may lower the cost of manufacture, may permit the glove wall to have different, variable or regional flexibility properties or may allow the use of some substances in the antiseptic composition which otherwise might not be possible. In the event of a puncture, the glove wall puncture can be useful as a means for bringing the components of the non-liquid antiseptic composition into contact or some state of mixture particularly at the puncture hole, on the glove-puncturing object, on the hand or in the hand wound should a wound occur, where the components may become mixed together and in some instances may perform a chemical reaction that can form a desired non-liquid antiseptic composition in part or whole; useful as a treatment of non-liquid antiseptic composition that may antiseptically help the hand and the hand wound that may have become contaminated with an infectious pathogen or other contaminant.

DETD

Alternatively, for some embodiments of the present invention, a peroxide chemical compound may be used to produce a gas. Examples of suitable peroxides include but are not limited to the following examples: (a) hydrogen peroxide; (b) magnesium peroxide or sodium peroxide (metal peroxides); or (c) benzoyl peroxide or succinyl peroxide (organic peroxides); and mixtures thereof. The liquid solvent for the peroxide would be water when hydrogen peroxide, benzoyl peroxide or succinyl peroxide is employed. The liquid solvent, diluent, or suspending agent would be an **anhydrous** oil or non-reactive organic fluid when a metal peroxide is employed due to the instability of these compounds in water. A peroxide stabilizing additive may be included with the peroxide to prolong the stability of the peroxide during glove storage before glove use. Subcompartments adjacent to the subcompartment(s) containing the peroxide may store the other components of the non-liquid antiseptic composition such as for example a powdered metal oxide catalyst capable of safely catalyzing rapid chemical decomposition of the peroxide into oxygen gas. The catalyst may be manganese dioxide, other finely powdered metals and metal oxides or any suitable chemical agent that is capable of suitably and safely decomposing a peroxide during chemical contact with it. The contact of the peroxide with the catalyst is useful as a means for generating gas bubbles in the non-liquid antiseptic composition; the gas production is useful as a means for altering the ambient gas pressure of the mixture so that the local mixture expands as a foaming mixture from the glove wall puncture site. The foaming mixture can exit from the glove wall onto the hand and into hand wound as a foam, gel, paste or creme of non-liquid antiseptic composition which can be useful as a non-liquid antiseptic composition treatment to the hand and the hand wound should a wound occur. In addition, the high oxygen partial pressure in the mixture may provide antiseptic activity. A more

than a 3 percent hydrogen peroxide solution may be used so that the final concentration of peroxide in the extruded non-liquid antiseptic composition is at least 3 percent. A 3 to 30 percent hydrogen peroxide concentration is known to have useful antiseptic activity. Well known combinations of metals with the forementioned acids can also produce hydrogen gas which can be used for the present invention to gas pressurize the non-liquid antiseptic composition as well. For some glove uses, a nonflammable gas such as carbon dioxide may be most preferable.

DETD (d) about 5 to about 15 parts **sodium lauryl**

**sulfate;**

DETD (e) about 0.1 to about 4 parts of **sodium lauryl**

**sulfate;** and

DETD To make the above composition, the cetyl alcohol and wax in the propylene glycol in a glass beaker can be melted on a water bath heated to 65.degree. C. The **sodium lauryl sulfate** can be dissolved in the water and povidone-iodine in a glass beaker which is heated to 65.degree. C. The oily liquid may then be added slowly to the water while the water is being well stirred. Stir the mixture for an additional 15 minutes or until good mixing has been achieved. One or more milliliters of the composition may be added to fill a glove compartment before the composition congeals.

DETD (e) about 0.1 to about 5 parts of **sodium lauryl**

**sulfate;** and

DETD To make the above composition, the cetyl alcohol can be melted in a beaker over a water bath, and then the **sodium lauryl sulfate** can be added while mixing well. The petrolatum and mineral oil can be added while heating so that the mixture melts completely and allow to cool to 23.degree. C. Combine the water and povidone-iodine to make a solution at 23.degree. C. in a beaker and then this aqueous solution can be added slowly with constant mixing to the cooled petrolatum composition. One or more milliliters of the composition may be added to fill a glove compartment.

DETD (d) about 0.01 to about 3 parts of Carbopol 934--available from B.F. Goodrich Chemical Co. and/or the like **polymers;**

DETD To make the above composition, the hydroxyethylcellulose can be added to the antiseptic and the glycerin (previously heated to between about 50.degree. C. to about 90.degree. C.) in a glass beaker. The antiseptics which may be used in this composition include but are not limited to the following: chlorhexidine gluconate, nonoxynol-9, and other antiseptics that are compatible with cellulose **polymers**. The liquified mixture can be mixed for 20 minutes and the pH adjusted to a pH between about 4 and about 8; preferably to about pH 4 to about 6; most preferably to a pH of about 4.5. After 30 minutes of mixing, the delta gluconolactone may be added. After an additional 30 minutes, the hot liquid mixture pH can be adjusted further if needed. One or more milliliters of the composition may be added to fill a glove compartment before the composition congeals at lower temperatures. This gel composition can be useful in latex gloves when rubber wall softening or weakening may be a design concern.

DETD Example 1 describes how the preferred embodiment of the present invention is made. 60 grams of polyethylene glycol 1540 molecular weight (PEG 1540) and 60 grams of polyethylene glycol 4000 molecular weight (PEG 4000) are heated to 65.degree. C. in a glass beaker A sitting in a hot water bath until the PEG 1540 and PEG 4000 has melted and are evenly mixed. 50 grams of ethanol, 80 grams of glycerin, 10 grams of stearyl alcohol and 50 grams of distilled sterile water, 30 grams of elemental iodine, 80 grams of potassium iodide, and 10 milligrams of FD&C Red Dye #40 are mixed in a second glass beaker B heated at 65.degree. C. in a water bath until the mixture appears homogeneous. The contents of beaker A and beaker B are combined and then the hot antiseptic composition is stirred for 120 minutes while maintaining the temperature of the composition at 65.degree. C. The stirring rate is adjusted to minimize the addition of air into the mixture. An inner glove layer of 1 mil thick polyethylene plastic (second material) is formed and cured until dry on a first hand mold. A slightly larger outer glove layer of 4 mil thick white neoprene rubber (first material) is formed and cured until

dry on a second hand mold. The interior surface of the rubber outer glove layer is evenly coated with about 9 milliliters of the warm liquified antiseptic composition. While it is still warm, the outer glove layer is then slipped over the inner glove layer on the first hand mold. The glove is then allowed to cool to 23.degree. C. during which time the antiseptic composition between the glove layer can gel. The end of compartment 4 of the glove is then sealed using a silicone containing **glue** (Archer Brand Silicone Rubber Cement, Radio Shack, Fort Worth, Tex., 76102) containing methyltriacetoxysilane (CAS 004253343), ethyltriacetoxysilane (CAS 017689779), polydimethylsiloxane, and silica (CAS 007631869).

DETD 200 grams of stearyl alcohol and 200 grams of petrolatum are heated in a glass beaker on a steam bath to melt them. To a second glass beaker on a steam bath, 1.3 grams of methylparaben, 0.8 grams of propylparaben, 10 grams of lauryl sulfate, 70 grams of propylene glycol, 120 grams of distilled sterile water, 120 grams of ethanol and 25 grams of povidone-iodine are added and mixed until the solution appears to have become well mixed at about 70.degree. C. The contents of the second beaker are then added gradually to the first beaker while mixing well to make the antiseptic composition. An inner glove layer of 5 mil thick polyethylene plastic (second material) is formed and cured until dry on a first hand mold. A slightly larger outer glove layer of 5 mil thick white neoprene rubber (first material) is formed and cured until dry on a second hand mold, and then is evenly filled with the about 10 milliliters of the hot liquified antiseptic composition. The outer glove layer is then slipped over the inner glove layer on the first hand mold. After the glove has cooled to room temperature and the antiseptic composition has gelled, the end of compartment 4 of the glove is sealed using a silicone containing **glue** mixture.

DETD The gloves for Example 4 are elongated in length compared to the other Glove Examples of the present invention from a length of 12 inches to a length of 30 inches) to include a protective arm portion that could be extended to the shoulder and arm pit. The non-liquid antiseptic composition contain 50 grams of elemental iodine, 50 grams of sodium iodide, 80 grams of distilled sterile water, 100 grams of polyoxyethylene glycol 1540 molecular weight, 100 grams of polyoxyethylene glycol 4000 molecular weight, 270 grams of isopropanol. The antiseptic composition is kept at 60.degree. C. until added to the glove compartment. An inner glove layer of 5 mil thick polyethylene plastic (second material) is formed and cured until dry on a long-armed first hand mold. A slightly larger outer glove layer of 8 mil thick white neoprene rubber (first material) is formed and cured until dry on a long-armed second hand mold, and is then evenly filled with the about 100 milliliters of the hot antiseptic composition. The outer glove layer is then slipped over the inner glove layer on the first hand mold and the temperature of the antiseptic composition is allowed to cool so that the composition gels. The shoulder arm end of compartment 4 of the glove is then sealed using a silicone containing **glue**.

DETD The gloves for Example 5 are made using a non-liquid antiseptic composition containing 30 grams of elemental iodine, 30 grams of sodium iodide, 50 grams of distilled sterile water, 60 grams of polyoxyethylene glycol 1540 molecular weight, 60 grams of polyoxyethylene glycol 4000 molecular weight, 0.01 grams of FD&C red dye No. 40, and 50 grams of ethanol. An inner glove layer of 4 mil thick polyethylene plastic (second material) is formed and cured until dry on a first hand mold. A slightly larger outer glove layer of 4 mil thick white latex rubber (first material) is formed and cured until dry on a second hand mold, and then is evenly filled with the about 10 milliliters of the antiseptic composition heated to a liquid state. The outer glove layer is then slipped over the inner glove layer on the first hand mold, and after the antiseptic composition gels, the end of compartment 4 of the glove is sealed using a silicone containing **glue**.

DETD The gloves for Example 6 are made using a non-liquid antiseptic composition containing 20 grams of povidone-iodine, 45 grams of distilled sterile water, 15 grams of cholesterol, 15 grams of stearyl alcohol, 50 grams of white wax, 750 grams of petrolatum, 0.01 grams of

FD&C red dye No. 40, and 150 grams of cetyl alcohol, and 10 milligrams of bradykinin. An inner glove layer of 4 mil thick polyethylene plastic (second material) is formed and cured until dry on a first hand mold. A slightly larger outer glove layer of 4 mil thick white latex rubber (first material) is formed and cured until dry on a second hand mold, and then is evenly filled with the about 10 milliliters of the antiseptic composition heated to a liquid state. The outer glove layer is then slipped over the inner glove layer on the first hand mold, and after the antiseptic composition gels, the end of compartment 4 of the glove is sealed using a silicone containing glue.

DETD The gloves for Example 7 are made using a non-liquid antiseptic composition containing 6.0 grams of sodium hypochlorite, 45 grams of cetyl alcohol, 10 grams of white wax, 15 grams of propylene glycol, 2 grams of **sodium lauryl sulfate**, 40 grams of distilled sterile water, 0.01 grams of FD&C red dye No. 40, and 0.5 grams of titanium dioxide. An inner glove layer of 4 mil thick polyethylene plastic (second material) is formed and cured until dry on a first hand mold. A slightly larger outer glove layer of 5 mil thick white latex rubber (first material) is formed and cured until dry on a second hand mold, and then is evenly filled with the about 10 milliliters of the antiseptic composition heated to liquid state. The outer glove layer is then slipped over the inner glove layer on the first hand mold, and after the antiseptic composition gels, the end of compartment 4 of the glove is sealed using a silicone containing glue.

DETD The gloves for Example 8 are made using a non-liquid antiseptic composition containing 6.0 grams of potassium hypochlorite, 35 grams of cetyl alcohol, 20 grams of mineral oil, 25 grams of petrolatum, 4 grams of **sodium lauryl sulfate**, 20 grams of distilled sterile water, 0.01 grams of FD&C red dye No. 40, and 1 gram of titanium dioxide. An inner glove layer of 1 mil thick polyethylene plastic (second material) is formed and cured until dry on a first hand mold. A slightly larger outer glove layer of 5 mil thick white neoprene rubber (first material) is formed and cured until dry on a second hand mold, and then is evenly filled with the about 10 milliliters of the antiseptic composition heated to a liquid state. The outer glove layer is then slipped over the inner glove layer on the first hand mold, and after the antiseptic composition gels, the end of compartment 4 of the glove is sealed using a silicone containing glue.

DETD The gloves for Example 9 are made using a non-liquid antiseptic composition containing 30 grams of potassium iodide, 30 grams of elemental iodide, 90 grams of distilled sterile water, 60 grams of polyoxyethylene glycol 1540, 60 grams of polyoxyethylene glycol 4000, 45 grams of 1,2,6-hexanetriol, 40 grams of isopropanol, 0.01 grams of FD&C red dye No. 40, and 0.5 grams of titanium dioxide. An inner glove layer of 1 mil thick polyethylene plastic (second material) is formed and cured until dry on a first hand mold. A slightly larger outer glove layer of 5 mil thick white latex rubber (first material) is formed and cured until dry on a second hand mold, and then is evenly filled with the about 10 milliliters of the antiseptic composition heated to a liquid state. The outer glove layer is then slipped over the inner glove layer on the first hand mold, and after the antiseptic composition gels, the end of compartment 4 of the glove is sealed using a silicone containing glue.

DETD The gloves for Example 10 are made using a non-liquid antiseptic composition containing 10 grams of povidone-iodine, 45 grams of distilled sterile water, 25 grams of glycerol monostearate, 50 grams of glycerin, 5 grams of bentonite, 45 grams of ethanol, 0.01 grams of FD&C red dye No. 40, and 0.5 grams of titanium dioxide. An inner glove layer of 1 mil thick polyethylene plastic (second material) is formed and cured until dry on a first hand mold. A slightly larger outer glove layer of 3 mil thick white polyethylene plastic (first material) is formed and cured until dry on a second hand mold, and then is evenly filled with the about 10 milliliters of the antiseptic composition heated to a liquid state. The outer glove layer is then slipped over the inner glove layer on the first hand mold, and after the antiseptic

composition gels, the end of compartment 4 of the glove is sealed using a silicone containing **glue**.

DETD The gloves for Example 11 are made using a non-liquid antiseptic composition containing 10 grams of povidone-iodine, 45 grams of distilled sterile water, 2 grams of methylcellulose, 2 grams of Carbopol 934, 1 gram of methylparaben, 10 grams of propylene glycol, 0.01 grams of FD&C red dye No. 40, and 0.5 grams of titanium dioxide. An inner glove layer of 1 mil thick polyethylene plastic (second material) is formed and cured until dry on a first hand mold. A slightly larger outer glove layer of 4 mil thick white latex rubber (first material) is formed and cured until dry on a second hand mold, and then is evenly filled with the about 10 milliliters of the antiseptic composition heated to a liquid state. The outer glove layer is then slipped over the inner glove layer on the first hand mold, and after the antiseptic composition gels, the end of compartment 4 of the glove is sealed using a silicone containing **glue**.

DETD The gloves for Example 12 are made using a non-liquid antiseptic composition containing 10 grams of povidone-iodine, 45 grams of distilled sterile water, 2 grams of hydroxypropylmethylcellulose, 2 grams of Carbopol 934, 1 gram of methylparaben, 10 grams of propylene glycol, 0.01 grams of FD&C red dye No. 40, and 0.5 grams of titanium dioxide. An inner glove layer of 1 mil thick polyethylene plastic (second material) is formed and cured until dry on a first hand mold. A slightly larger outer glove layer of 4 mil thick white latex rubber (first material) is formed and cured until dry on a second hand mold, and then is evenly filled with the about 10 milliliters of the antiseptic composition heated to a liquid state. The outer glove layer is then slipped over the inner glove layer on the first hand mold, and after the antiseptic composition gels, the end of compartment 4 of the glove is sealed using a silicone containing **glue**.

DETD The gloves for Example 13 are made using a non-liquid antiseptic composition containing 20 grams of povidone-iodine, 10 grams of distilled sterile water, 30 grams of polyoxyethylene glycol of 1540 molecular weight, 35 grams of polyoxyethylene glycol of 4000 molecular weight, 45 grams of stearyl alcohol, 0.01 grams of FD&C red dye No. 40, and 0.5 grams of titanium dioxide. An inner glove layer of 1 mil thick polyethylene plastic (second material) is formed and cured until dry on a first hand mold. A slightly larger outer glove layer of 4 mil thick white latex rubber (first material) is formed and cured until dry on a second hand mold, and then is evenly filled with the about 10 milliliters of the antiseptic composition heated to a liquid state. The outer glove layer is then slipped over the inner glove layer on the first hand mold, and after the antiseptic composition gels, the end of compartment 4 of the glove is sealed using a silicone containing **glue**.

DETD The gloves for Example 14 are made using a non-liquid antiseptic composition containing 25 grams of iodine, 30 grams of polyoxyethylene glycol of 1540 molecular weight, 30 grams of polyoxyethylene glycol of 4000 molecular weight, 25 grams of polyethylene glycol 400 monostearate, 0.01 grams of FD&C red dye No. 40, and 0.5 grams of titanium dioxide. An inner glove layer of 1 mil thick polyethylene plastic (second material) is formed and cured until dry on a first hand mold. A slightly larger outer glove layer of 4 mil thick white latex rubber (first material) is formed and cured until dry on a second hand mold, and then is evenly filled with the about 10 milliliters of the antiseptic composition heated to a liquid state. The outer glove layer is then slipped over the inner glove layer on the first hand mold, and after the antiseptic composition gels, the end of compartment 4 of the glove is sealed using a silicone containing **glue**.

DETD The gloves for Example 15 are made using a non-liquid antiseptic composition containing 25 grams of 20 percent strength aqueous hydrogen peroxide, 0.1 grams of calcium citrate, 5 grams of sodium alginate, 0.5 grams of methylparaben, 30 grams of glycerin, 15 grams of distilled sterile water, 5 grams of isopropanol, 0.01 grams of FD&C red dye No. 40, and 0.5 grams of titanium dioxide. An inner glove layer of 3 mil thick polyethylene plastic (second material) is formed and cured until

dry on a first hand mold. A slightly larger outer glove layer of 5 mil thick white latex rubber (first material) is formed and cured until dry on a second hand mold, and then is evenly filled with the about 10 milliliters of the antiseptic composition heated to a liquid state. The outer glove layer is then slipped over the inner glove layer on the first hand mold, and after the antiseptic composition gels, the end of compartment & of the glove is sealed using a silicone containing

glue.

DETD The gloves for Example 18 are made using a non-liquid antiseptic composition containing 25 grams of sodium hypochlorite, 45 grams of distilled sterile water, 25 grams of polyoxyethylene glycol of 400 molecular weight, 25 grams of polyoxyethylene glycol of 6000 molecular weight, 10 grams of n-butanol, 30 grams of ethanol, 0.01 grams of FD&C red dye No. 40, and 0.5 grams of titanium dioxide. An inner glove layer of 3 mil thick polyethylene plastic (second material) is formed and cured until dry on a first hand mold. A slightly larger outer glove layer of 4 mil thick white neoprene rubber (first material) is formed and cured until dry on a second hand mold, and then is evenly filled with the about 10 milliliters of the antiseptic composition heated to a liquid state. The outer glove layer is then slipped over the inner glove layer on the first hand mold, and after the antiseptic composition gels, the end of compartment 4 of the glove is sealed using a silicone containing glue.

DETD The gloves for Example 17 are made using a non-liquid antiseptic composition containing 25 grams of chlorhexidine gluconate, 45 grams of distilled sterile water, 15 grams of polyoxyethylene glycol of 1540 molecular weight, 15 grams of polyoxyethylene glycol of 4000 molecular weight, 30 grams of benzyl alcohol, 0.01 grams of FD&C red dye No. 40, and 0.5 grams of titanium dioxide. An inner glove layer of 3 mil thick polyethylene plastic (second material) is formed and cured until dry on a first hand mold. A slightly larger outer glove layer of 4 mil thick white latex rubber (first material) is formed and cured until dry on a second hand mold, and then is evenly filled with the about 10 milliliters of the antiseptic composition heated to a liquid state. The outer glove layer is then slipped over the inner glove layer on the first hand mold, and after the antiseptic composition gels, the end of compartment 4 of the glove is sealed using a silicone containing

glue.

DETD The gloves for Example 19 are made using a non-liquid antiseptic composition containing 25 grams of chlorhexidine gluconate, 15 grams of yellow wax, 17 grams of wool fat, 40 grams of petrolatum, 22 grams of glycerin, 15 grams of distilled sterile water, 30 grams of ethanol, 0.01 grams of FD&C red dye No. 40, and 0.5 grams of zinc sulfate. An inner glove layer of 3 mil thick polyethylene plastic (second material) is formed and cured until dry on a first hand mold. A slightly larger outer glove layer of 4 mil thick white latex rubber (first material) is formed and cured until dry on a second hand mold, and then is evenly filled with the about 10 milliliters of the antiseptic composition heated to a liquid state. The outer glove layer is then slipped over the inner glove layer on the first hand mold, and after the antiseptic composition gels, the end of compartment 4 of the glove is sealed using a silicone containing glue.

DETD The gloves for Example 20 are made using a non-liquid antiseptic composition containing 25 grams of nonoxynol-9, 10 grams of cholesterol, 10 grams of stearyl alcohol, 25 grams of white wax, and 300 grams of white petrolatum. An inner glove layer of 3 mil thick polyethylene plastic (second material) is formed and cured until dry on a first hand mold. A slightly larger outer glove layer of 4 mil vinyl plastic (first material) is formed and cured until dry on a second hand mold, and then is evenly filled with the about 10 milliliters of the antiseptic composition heated to a liquid state. The outer glove layer is then slipped over the inner glove layer on the first hand mold, and after the antiseptic composition gels, the end of compartment 4 of the glove is sealed using a silicone containing glue.

DETD The gloves for Example 21 are made using a non-liquid antiseptic composition containing 25 grams of sodium dichloroisocyanurate, 10 grams

of cholesterol, 10 grams of stearyl alcohol, 25 grams of white wax, and 300 grams of white petrolatum. An inner glove layer of 3 mil thick polyethylene plastic (second material) is formed and cured until dry on a first hand mold. A slightly larger outer glove layer of 2 mil thick saran plastic with a 3 mil thick coating of white latex rubber (first material composite) is formed and cured until dry on a second hand mold, and then is evenly filled with the about 10 milliliters of the antiseptic composition heated to a liquid state. The outer glove layer is then slipped over the inner glove layer on the first hand mold, and after the antiseptic composition gels, the end of compartment 4 of the glove is sealed using a silicone containing **glue**.

DETD The gloves for Example 22 are made using a non-liquid antiseptic composition containing 25 grams of hexachlorophene, 5 grams of elemental iodine, 5 grams of creosote, 10 grams of pine oil NF, 5 grams of phenol, 5 grams of potassium hypochlorite, 0.25 grams of methyparaben, 10 grams of **sodium lauryl sulfate**, 80 grams of propylene glycol, 200 grams of stearyl alcohol, 250 grams of white petrolatum and 300 grams of distilled sterile water and 0.5 grams of peppermint oil. An inner glove layer of about 30 mils thick polyethylene plastic (second material) is formed and cured until dry on a first hand mold. A slightly larger outer glove layer of 40 mils thick white neoprene rubber (first material) is formed and cured until dry on a second hand mold, and then is evenly filled with the about 25 milliliters of the antiseptic composition in a hot liquified state. The outer glove layer is then slipped over the inner glove layer on the first hand mold and the glove is allowed to cool so that the composition gels. The end of compartment 4 of the glove is sealed using a silicone containing **glue**. The thicker glove layers of this embodiment of the present invention are designed to provide a strong physical barrier and still provide a glove with suitable flexibility for some gloved workers: including for example law enforcement workers, prison workers, psychiatric hospital workers, sanitation workers, and the like workers whose hands do not generally need to perform delicate manual tasks. This glove design is not optimally worn by a person who would perform medical surgery, draw blood, or dental work where a thinner glove must be used.

DETD The gloves for Example 23 are made using a non-liquid antiseptic composition containing 15 grams of sodium perborate NF, 15 grams of cetyl alcohol, 1 gram of white wax, 10 grams of propylene glycol, 2 grams of **sodium lauryl sulfate**, 10 grams of white petrolatum and 40 grams of distilled sterile water. An inner glove layer of 1 mil thick polyethylene plastic (second material) is formed and cured until dry on a first hand mold. A slightly larger outer glove layer of 5 mil thick white neoprene rubber (first material) is formed and cured until dry on a second hand mold, and then is evenly filled with the about 10 milliliters of the antiseptic composition heated to a liquid state. The outer glove layer is then slipped over the inner glove layer on the first hand mold, and after the antiseptic composition gels, the end of compartment 4 of the glove is sealed using a silicone containing **glue**.

DETD The gloves for Example 24 are made using a non-liquid antiseptic composition containing 25 grams of potassium dichloroisocyanurate, 15 grams of cetyl alcohol, 1 gram of white wax, 10 grams of propylene glycol, 2 grams of **sodium lauryl sulfate**, 15 grams of mineral oil, and 50 grams of distilled sterile water. An inner glove layer of 3 mil thick polyethylene plastic (second material) is formed and cured until dry on a first hand mold. A slightly larger outer glove layer of 2 mil thick white polyethylene plastic (first material) is formed and cured until dry on a second hand mold, and then is evenly filled with the about 10 milliliters of the antiseptic composition heated to a liquid state. The outer glove layer is then slipped over the inner glove layer on the first hand mold, and after the antiseptic composition gels, the end of compartment 4 of the glove is sealed using a silicone containing **glue**.

DETD The gloves for Example 25 are made using a non-liquid antiseptic composition containing 5 grams of bacitracin, 5 grams of norfloxacin,

and 2 grams of **polymixin B** sulfate, 10 grams of calcium carbonate, 10 grams of potassium bicarbonate, 15 grams of cetyl alcohol, 1 gram of white wax, 30 grams of white petrolatum, 5 grams of propylene glycol, 1 gram of menthol, 1 gram of **sodium lauryl sulfate**, and 55 grams of distilled sterile water. An inner glove layer of 2 mil thick polyethylene plastic (second material) is formed and cured until dry on a first hand mold. A slightly larger outer glove layer of 3 mil thick white polyethylene plastic (first material) is formed and cured until dry on a second hand mold, and then is evenly filled with the about 10 milliliters of the antiseptic composition heated to a liquid state. The outer glove layer is then slipped over the inner glove layer on the first hand mold, and after the antiseptic composition gels, the end of compartment 4 of the glove is sealed using a silicone containing **glue**.

DETD The gloves for Example 26 are made using a non-liquid antiseptic composition containing 55 grams of 37 percent by weight formaldehyde solution (Formalin solution), 20 grams of potassium iodide, 5 grams of stearyl alcohol, 5 grams of cetyl alcohol, 1 gram of white wax, 1.5 grams of **sodium lauryl sulfate**, 15 grams of white petrolatum and 15 grams of mineral oil. An inner glove layer of 3 mil thick polyethylene plastic (second material) is formed and cured until dry on a first hand mold. A slightly larger outer glove layer of 3 mil thick polyethylene plastic (first material) is formed and cured until dry on a second hand mold, and then is evenly filled with the about 10 milliliters of the antiseptic composition heated to a liquid state. The outer glove layer is then slipped over the inner glove layer on the first hand mold, and after the antiseptic composition gels, the end of compartment 4 of the glove is sealed using a silicone containing **glue**.

DETD The gloves for Example 27 are made using a non-liquid antiseptic composition containing 2 grams of potassium permanganate in 75 grams of distilled sterile water, 1 gram of white wax, and 55 grams of white petrolatum. An inner glove layer of 3 mil thick polyethylene plastic (second material) is formed and cured until dry on a first hand mold. A slightly larger outer glove layer of 1 mil thick polyethylene plastic coated with a 4 mil thick white latex rubber layer (first material composite) is formed and cured until dry on a second hand mold, and then is evenly filled with the about 10 milliliters of the antiseptic composition heated to a liquid state. The outer glove layer is then slipped over the inner glove layer on the first hand mold, and after the antiseptic composition gels, the end of compartment 4 of the glove is sealed using a silicone containing **glue**.

DETD An inner glove layer of 2 mil thick polyethylene plastic (second material) is formed and cured until dry on a first hand mold. This is coated with about 8 grams of the permanganate emulsion composition while it is still warm and liquified. After this emulsion gels with cooling, the emulsion is spray coated with a 1.5 mil plastic film which is allowed to dry. This intermediate plastic film layer is then dip-coated with about 8 grams of the formaldehyde emulsion formulation while it is still warm and liquified. Over the gelled formaldehyde emulsion, an outer glove layer of 1 mil thick polyethylene plastic is spray-coated with a layer of 4 mil thick white latex rubber (first material) and allowed to harden. Care is taken not prevent contamination of the two compartments, and the ends of the inner and outer compartments of the glove are sealed using a silicone containing **glue**.

DETD An inner glove layer of 2 mil thick polyethylene plastic (second material) is formed and cured until dry on a first hand mold. This is coated with about 8 grams of the permanganate emulsion composition while it is still warm and liquified. After this emulsion gels with cooling, the emulsion is spray coated with a 0.5 mil plastic film which is allowed to dry. This intermediate plastic film layer is then dip-coated with about 8 grams of the formaldehyde emulsion formulation while it is still warm and liquified. An outer glove layer of 4 mil thick white neoprene rubber (first material) is spray-coated over the galled formaldehyde emulsion and allowed to harden. Care is taken not prevent contamination of the two compartments, and the ends of the inner and

outer compartments of the glove are sealed using a silicone containing glue.

- DETD The gloves for Example 30 are made using a non-liquid antiseptic composition containing 25 grams of 20 percent hydrogen peroxide solution, 48 grams of polyoxyethylene glycol 400 molecular weight, 48 grams of polyoxyethylene glycol 4000 molecular weight, and 10 grams of stearyl alcohol. An inner glove layer of a 3 mil thick polyethylene plastic (second material) is formed and cured until dry on a first hand mold. A slightly larger outer glove layer of 4 mil thick white latex rubber (first material) is formed and cured until dry on a second hand mold, and then is evenly filled with the about 10 milliliters of the antiseptic composition heated to a liquid state. The outer glove layer is then slipped over the inner glove layer on the first hand mold, and after the antiseptic composition gels, the end of compartment 4 of the glove is sealed using a silicone containing glue.
- DETD The gloves for Example 31 are made using a non-liquid antiseptic composition containing 25 grams of 20 percent hydrogen peroxide solution, 48 grams of polyoxyethylene glycol 400 molecular weight, 48 grams of polyoxyethylene glycol 1540 molecular weight, and 10 grams of stearyl alcohol. An inner glove layer of 0.3 mil thick polyethylene plastic (second material) is formed and cured until dry on a first hand mold. A slightly larger outer glove layer of 5 mil thick white neoprene rubber (first material) is formed and cured until dry on a second hand mold, and then is evenly filled with the about 6 milliliters of the antiseptic composition heated to a liquid state. The latex rubber whitener (colorant) is zinc oxide. The outer glove layer is then slipped over the inner glove layer on the first hand mold, and after the antiseptic composition gels, the end of compartment 4 of the glove is sealed using a silicone glue.
- DETD The gloves for Example 32 are made using a non-liquid antiseptic composition containing 10 grams of sodium hypochlorite, 15 grams of polyoxyethylene glycol 4000 molecular weight, 10 grams of cetyl alcohol, 10 grams of stearyl alcohol, 17 grams of glycerin, 0.7 grams of sodium lauryl sulfate, and 50 grams of distilled sterile water. An inner glove layer of 4 mil thick latex rubber (second material) is formed and cured until dry on a first hand mold. A slightly larger outer glove layer of 4 mil thick case-hardened black latex rubber (first material) is formed and cured until dry on a second hand mold, and then is evenly filled with the about 10 milliliters of the antiseptic composition heated to a liquid state. The black colorant is powdered sterile charcoal. The outer glove layer is then slipped over the inner glove layer on the first hand mold, and after the antiseptic composition gels, the end of compartment 4 of the glove is sealed using a silicone containing glue.
- DETD The gloves for Example 33 are made using a non-liquid antiseptic composition containing 10 grams of sodium hypochlorite, 40 grams of distilled sterile water, 32 grams of 1,2,6-hexanetriol, 47 grams of polyoxyethylene glycol 400 molecular weight, and 58 grams of polyoxyethylene glycol 4000. An inner glove layer of 0.6 mil thick polyethylene plastic (second material) is formed and cured until dry on a first hand mold. A slightly larger outer glove layer of 5 mil thick white latex rubber (first material) is formed and cured until dry on a second hand mold, and then is evenly filled with the about 10 milliliters of the antiseptic composition heated to a liquid state. The outer glove layer is then slipped over the inner glove layer on the first hand mold, and after the antiseptic composition gels, the end of compartment 4 of the glove is sealed using a silicone containing glue.
- DETD The gloves for Example 34 are made using a non-liquid antiseptic composition containing 2 grams of elemental iodine, 3 grams of sodium iodide, 0.5 grams of iodoform, 10 grams of distilled sterile water, 1 gram of sorbitan monopalmitate, 40 grams of polyoxyethylene glycol 400 molecular weight, and 50 grams of polyoxyethylene glycol 4000. An inner glove layer of 2 mil thick polyethylene plastic (second material) is formed and cured until dry on a first hand mold. A slightly larger outer glove layer of 6 mil thick white latex rubber (first material) is formed

and cured until dry on a second hand mold, and then is evenly filled with the about 10 milliliters of the antiseptic composition heated to a liquid state. The outer glove layer is then slipped over the inner glove layer on the first hand mold, and after the antiseptic composition gels, the end of compartment 4 of the glove is sealed using a silicone containing **glue**.

DETD The gloves for Example 35 are made using a non-liquid antiseptic composition containing 8 grams of nonoxynol-9, 5 grams of octoxynol, 2 grams of sodium tetradecyl sulfate, 24 grams of distilled sterile water, 4 grams of sorbitan monopalmitate, 40 grams of polyoxyethylene glycol 400 molecular weight, 40 grams of polyoxyethylene glycol 4000 and 10 grams of glycerin. An inner glove layer of 1 mil thick polyethylene plastic (second material) is formed and cured until dry on a first hand mold. A slightly larger outer glove layer of 5 mil thick white latex rubber (first material) is formed and cured until dry on a second hand mold, and then is evenly filled with the about 10 milliliters of the antiseptic composition heated to a liquid state. The outer glove layer is then slipped over the inner glove layer on the first hand mold, and after the antiseptic composition gels, the end of compartment 4 of the glove is sealed using a silicone containing **glue**.

DETD The gloves for Example 36 are made using a non-liquid antiseptic composition containing 15 grams of 50% by weight concentrated trichloroacetic acid, 10 grams of cholesterol, 10 grams of stearyl alcohol, 25 grams of white wax, and 300 grams of white petrolatum. An inner glove layer of 3 mil thick polyethylene plastic (second material) is formed and cured until dry on a first hand mold. A slightly larger outer glove layer of 4 mil thick white neoprene rubber (first material) is formed and cured until dry on a second hand mold, and then is evenly filled with the about 10 milliliters of the antiseptic composition heated to a liquid state. The outer glove layer is then slipped over the inner glove layer on the first hand mold, and after the antiseptic composition gels, the end of compartment 4 of the glove is sealed using a silicone containing **glue**.

DETD The gloves for Example 37 are made using a non-liquid antiseptic composition containing 5 grams of eucalyptus oil, 4 grams of phenyl salicylate, 3 grams of pine oil NF, 5 grams of povidone-iodine, and 3 grams of o-phenylphenol, 10 grams of cholesterol, 10 grams of stearyl alcohol, 25 grams of white wax, and 300 grams of white petrolatum. An inner glove layer of 3 mil thick polyethylene plastic (second material) is formed and cured until dry on a first hand mold. A slightly larger outer glove layer of 5 mil thick neoprene latex rubber (first material) is formed and cured until dry on a second hand mold, and then is evenly filled with the about 10 milliliters of the antiseptic composition heated to a liquid state. The outer glove layer is then slipped over the inner glove layer on the first hand mold, and after the antiseptic composition gels, the end of compartment 4 of the glove is sealed using a silicone containing **glue**.

DETD The gloves for Example 38 are made using a non-liquid antiseptic composition containing 10 grams of poloxamer 188, and 10 grams of cetylpyridinium chloride, 50 grams of distilled sterile water, 10 grams of cetyl alcohol, 5 grams of glycerin, 40 grams of polyoxyethylene glycol 400 molecular weight and 38 grams of polyoxyethylene glycol 4000 molecular weight. An inner glove layer of 2 mil thick polyethylene plastic (second material) is formed and cured until dry on a first hand mold. A slightly larger outer glove layer of 4 mil thick white latex rubber (first material) is formed and cured until dry on a second hand mold, and then is evenly filled with the about 10 milliliters of the antiseptic composition heated to a liquid state. The outer glove layer is then slipped over the inner glove layer on the first hand mold, and after the antiseptic composition gels, the end of compartment 4 of the glove is sealed using a silicone containing **glue**.

DETD The gloves for Example 39 are made using a non-liquid antiseptic composition containing 22 grams of methylbenzethonium chloride, 50 grams of distilled sterile water, 10 grams of cetyl alcohol, 5 grams of glycerin, 40 grams of polyoxyethylene glycol 400 molecular weight and 38 grams of polyoxyethylene glycol 4000 molecular weight. An inner glove

layer of 2 mil thick polyethylene plastic (second material) is formed and cured until dry on a first hand mold. A slightly larger outer glove layer of 4 mil thick white latex rubber (first material) is formed and cured until dry on a second hand mold, and then is evenly filled with the about 10 milliliters of the antiseptic composition heated to a liquid state. The outer glove layer is then slipped over the inner glove layer on the first hand mold, and after the antiseptic composition gels, the end of compartment 4 of the glove is sealed using a silicone containing **glue**.

DETD An inner glove layer of 3 mil thick polyethylene plastic (second material) is formed and cured until dry on a first hand mold. This is coated with about 8 grams of the permanganate emulsion composition while it is still warm and liquified. After this emulsion gels with cooling, the emulsion is spray coated with a 0.5 mil plastic film which is allowed to dry. This intermediate plastic film layer is then dip-coated with about 8 grams of the glutaraldehyde emulsion formulation while it is still warm and liquified. An outer glove layer of 4 mil thick white neoprene rubber (first material) is spray-coated over the gelled glutaraldehyde emulsion and allowed to harden. Care is taken not prevent contamination of the two compartments, and the ends of the inner and outer compartments of the glove are sealed using a silicone containing **glue**.

DETD An inner glove layer of 0.3 mil thick polyethylene plastic (second material) is formed and cured until dry on a first hand mold. This is coated with about 8 grams of the bicarbonate-containing emulsion composition while it is still warm and liquified. After this emulsion gels with cooling, the emulsion is spray coated with a 0.5 mil plastic film which is allowed to dry. This intermediate plastic film layer is then dip-coated with about 8 grams of the acidic emulsion formulation while it is still warm and liquified. An outer glove layer of 4 mil thick white latex rubber (first material) is spray-coated over the gelled acidic emulsion and allowed to harden. Care is taken not prevent contamination of the two compartments, and the ends of the inner and outer compartments of the glove are sealed using a silicone containing **glue**.

DETD An inner glove layer of 0.3 mil thick polyethylene plastic (second material) is formed and cured until dry on a first hand mold. This is coated with about 8 grams of the bicarbonate-containing emulsion composition while it is still warm and liquified. After this emulsion gels with cooling, the emulsion is spray coated with a 0.5 mil plastic film which is allowed to dry. This intermediate plastic film layer is then dip-coated with about 8 grams of the acidic emulsion formulation while it is still warm and liquified. An outer glove layer of 4 mil thick white latex rubber (first material) is spray-coated over the gelled acidic emulsion and allowed to harden. Care is taken not prevent contamination of the two compartments, and the ends of the inner and outer compartments of the glove are sealed using a silicone containing **glue**.

DETD An inner glove layer of 0.3 mil thick polyethylene plastic (second material) is formed and cured until dry on a first hand mold. This is coated with about 8 grams of the bicarbonate-containing emulsion composition while it is still warm and liquified. After this emulsion gels with cooling, the emulsion is spray coated with a 0.5 mil plastic film which is allowed to dry. This intermediate plastic film layer is then dip-coated with about 8 grams of the acidic emulsion formulation while it is still warm and liquified. An outer glove layer of 4 mil thick white neoprene rubber (first material) is spray-coated over the gelled acidic emulsion and allowed to harden. Care is taken not prevent contamination of the two compartments, and the ends of the inner and outer compartments of the glove are sealed using a silicone containing **glue**.

DETD An inner glove layer of 0.3 mil thick polyethylene plastic (second material) is formed and cured until dry on a first hand mold. This is coated with about 8 grams of the bicarbonate-containing emulsion composition while it is still warm and liquified. After this emulsion gels with cooling, the emulsion is spray coated with a 0.5 mil plastic

film which is allowed to dry. This intermediate plastic film layer is then dip-coated with about 8 grams of the acidic emulsion formulation while it is still warm and liquified. An outer glove layer of 4 mil thick white latex rubber (first material) is spray-coated over the gelled acidic emulsion and allowed to harden. Care is taken not prevent contamination of the two compartments, and the ends of the inner and outer compartments of the glove are sealed using a silicone containing

glue.

DETD An inner glove layer of 0.3 mil thick polyethylene plastic (second material) is formed and cured until dry on a first hand mold. This is coated with about 8 grams of the bicarbonate-containing emulsion composition while it is still warm and liquified. After this emulsion gels with cooling, the emulsion is spray coated with a 0.5 mil plastic film which is allowed to dry. This intermediate plastic film layer is then dip-coated with about 8 grams of the acidic emulsion formulation while it is still warm and liquified. An outer glove layer of 4 mil thick white neoprene rubber (first material) is spray-coated over the gelled acidic emulsion and allowed to harden. Care is taken not prevent contamination of the two compartments, and the ends of the inner and outer compartments of the glove are sealed using a silicone containing

glue.

DETD An inner glove layer of 1 mil thick polyethylene plastic (second material) is formed and cured until dry on a first hand mold. This is coated with about 8 grams of the bicarbonate-containing emulsion composition while it is still warm and liquified. After this emulsion gels with cooling, the emulsion is spray coated with a 0.5 mil plastic film which is allowed to dry. This intermediate plastic film layer is then dip-coated with about 8 grams of the acidic emulsion formulation while it is still warm and liquified. An outer glove layer of 5 mil thick white neoprene rubber (first material) is spray-coated over the gelled acidic emulsion and allowed to harden. Care is taken not prevent contamination of the two compartments, and the ends of the inner and outer compartments of the glove are sealed using a silicone containing

glue.

DETD An inner glove layer of 1 mil thick polyethylene plastic (second material) is formed and cured until dry on a first hand mold. This is coated with about 8 grams of the bicarbonate-containing emulsion composition while it is still warm and liquified. After this emulsion gels with cooling, the emulsion is spray coated with a 0.5 mil plastic film which is allowed to dry. This intermediate plastic film layer is then dip-coated with about 8 grams of the acidic emulsion formulation while it is still warm and liquified. Over the gelled acidic emulsion an outer glove layer of 2 mil thick polyethylene plastic is then spray-coated with a 3 mil thick layer of white latex rubber (first material composite) and allowed to harden. Care is taken not prevent contamination of the two compartments, and the ends of the inner and outer compartments of the glove are sealed using a silicone containing

glue.

DETD An inner glove layer of 1 mil thick polyethylene plastic (second material) is formed and cured until dry on a first hand mold. This is coated with about 8 grams of the bicarbonate-containing emulsion composition while it is still warm and liquified. After this emulsion gels with cooling, the emulsion is spray coated with a 0.5 mil plastic film which is allowed to dry. This intermediate plastic film layer is then dip-coated with about 8 grams of the acidic emulsion formulation while it is still warm and liquified. An outer glove layer of 5 mil thick white neoprene rubber (first material) is spray-coated over the gelled acidic emulsion and allowed to harden. Care is taken not prevent contamination of the two compartments, and the ends of the inner and outer compartments of the glove are sealed using a silicone containing

glue.

DETD An inner glove layer of 1 mil thick polyethylene plastic (second material) is formed and cured until dry on a first hand mold. This is coated with about 8 grams of the bicarbonate-containing emulsion composition while it is still warm and liquified. After this emulsion gels with cooling, the emulsion is spray coated with a 0.5 mil plastic

film which is allowed to dry. This intermediate plastic film layer is then dip-coated with about 8 grams of the acidic emulsion formulation while it is still warm and liquified. An outer glove layer of 5 mil thick white neoprene rubber (first material) is spray-coated over the gelled acidic emulsion and allowed to harden. Care is taken not prevent contamination of the two compartments, and the ends of the inner and outer compartments of the glove are sealed using a silicone containing

glue.

DETD An inner glove layer of 1 mil thick polyethylene plastic (second material) is formed and cured until dry on a first hand mold. This is coated with about 8 grams of the bicarbonate-containing emulsion composition while it is still warm and liquified. After this emulsion gels with cooling, the emulsion is spray coated with a 0.5 mil plastic film which is allowed to dry. This intermediate plastic film layer is then dip-coated with about 8 grams of the acidic emulsion formulation while it is still warm and liquified. An outer glove layer of 5 mil thick white neoprene rubber (first material) is spray-coated over the gelled acidic emulsion and allowed to harden. Care is taken not prevent contamination of the two compartments, and the ends of the inner and outer compartments of the glove are sealed using a silicone containing

glue.

DETD The gloves for Example 51 are made using a non-liquid antiseptic composition containing 10 grams of benzoyl peroxide, 40 grams of distilled sterile water, 32 grams of 1,2,6-hexanetriol, 47 grams of polyoxyethylene glycol 400 molecular weight, and 58 grams of polyoxyethylene glycol 4000. An inner glove layer of 0.6 mil thick polyethylene plastic (second material) is formed and cured until dry on a first hand mold. A slightly larger outer glove layer of 5 mil thick white latex rubber (first material) is formed and cured until dry on a second hand mold, and then is evenly filled with the about 10 milliliters of the antiseptic composition heated to a liquid state. The outer glove layer is then slipped over the inner glove layer on the first hand mold, and after the antiseptic composition gels, the end of compartment 4 of the glove is sealed using a silicone containing

glue.

DETD The gloves for Example 52 are made using a non-liquid antiseptic composition containing 10 grams of zinc peroxide, 20 grams of 70% by volume isopropanol in distilled sterile water, 32 grams of 1,2,6-hexanetriol, 47 grams of polyoxyethylene glycol 400 molecular weight, and 58 grams of polyoxyethylene glycol 4000. An inner glove layer of 2 mil thick polyethylene plastic (second material) is formed and cured until dry on a first hand mold. A slightly larger outer glove layer of 5 mil thick white latex rubber (first material) is formed and cured until dry on a second hand mold, and then is evenly filled with the about 10 milliliters of the antiseptic composition heated to a liquid state. The outer glove layer is then slipped over the inner glove layer on the first hand mold, and after the antiseptic composition gels, the end of compartment 4 of the glove is sealed using a silicone containing

glue.

DETD The gloves for Example 53 are made using a non-liquid antiseptic composition containing 10 grams of hydrogen peroxide, 20 grams of ethanol, 32 grams of 1,2,6-hexanetriol, 47 grams of polyoxyethylene glycol 400 molecular weight, and 58 grams of polyoxyethylene Glycol 4000. An inner glove layer of 2 mil thick polyethylene plastic (second material) is formed and cured until dry on a first hand mold. A slightly larger outer glove layer of 5 mil thick white latex rubber (first material) is formed and cured until dry on a second hand mold, and then is evenly filled with the about 10 milliliters of the antiseptic composition heated to a liquid state. The outer glove layer is then slipped over the inner glove layer on the first hand mold, and after the antiseptic composition Gels, the end of compartment 4 of the glove is sealed using a silicone containing

glue.

DETD The gloves for Example 54 are made using a non-liquid antiseptic composition containing 5 grams of chlorhexidine gluconate in 20 grams of isopropanol, 10 grams of distilled sterile water, 20 grams of glycerine, 42 grams of polyoxyethylene glycol 1540 molecular weight, and 5 grams of

sodium oleate. An inner glove layer of 2 mil thick polyethylene plastic (second material) is formed and cured until dry on a first hand mold. A slightly larger outer glove layer of 2 mil thick white polyethylene plastic (first material) is formed and cured until dry on a second hand mold, and then is evenly filled with the about 10 milliliters of the antiseptic composition heated to a liquid state. The outer glove layer is then slipped over the inner glove layer on the first hand mold, and after the antiseptic composition gels, the end of compartment 4 of the glove is sealed using a silicone containing **glue**.

DETD The gloves for Example 55 are made using a non-liquid antiseptic composition containing 5 grams of elemental iodine, 5 grams of potassium iodide, 30 grams of isopropanol, 2 grams of 50 percent strength glacial acetic acid diluted by weight with distilled sterile water, 1 gram of sodium acetate, 25 grams of polyoxyethylene glycol 1540 molecular weight, 2 grams of cetyl alcohol, and 5 grams of propylene glycol. An inner glove layer of 0.6 mil thick polyethylene plastic (second material) is formed and cured until dry on a first hand mold. A slightly larger outer glove layer of 6 mil thick white neoprene rubber (first material) is formed and cured until dry on a second hand mold, and then is evenly filled with the about 10 milliliters of the antiseptic composition heated to a liquid state. The outer glove layer is then slipped over the inner glove layer on the first hand mold, and after the antiseptic composition gels, the end of compartment 4 of the glove is sealed using a silicone containing **glue**.

DETD The gloves for Example 56 are made using a non-liquid antiseptic composition containing 50 grams of denatured ethanol and 15 grams of polyoxyethylene glycol 1540 molecular weight. An inner glove layer of 1 mil thick polyethylene plastic (second material) is formed and cured until dry on a first hand mold. A slightly larger outer glove layer of 4 mil thick white latex rubber (first material) is formed and cured until dry on a second hand mold, and then is evenly filled with the about 6 milliliters of the antiseptic composition heated to a liquid state. The outer glove layer is then slipped over the inner glove layer on the first hand mold, and after the antiseptic composition gels, the end of compartment 4 of the glove is sealed using a silicone containing **glue**.

CLM What is claimed is:

3. A glove according to claim 1, wherein the first material and the second material comprise: a structural material selected from the group consisting of latex rubber, cis-1,4-polyisoprene, cis-polybutadiene, neoprene rubber, nitrile rubber, silicone rubber, case-hardened rubber, isobutylene-isoprene 1. butyl rubber, butadieneacrylonitrile 1. nitrile rubber, styrene-butadiene rubber, ethylene-propylene copolymer, ethylene-propylene diene terpolymer, polyisobutylene, chlorosulphonated polyeten, ester-type urethan rubber, polychlormethyloxyran epichlorhydrin rubber, epichlorhydrin copolymer with ethyleneoxydichlormethyloxyran copolymer cellulose **acetate** plastic, **vinyl** plastic, polyethylene plastic, polypropylene plastic, polyvinyl chloride plastic, **polyvinyl acetate** plastic, polystyrene plastic, **polymethyl** methyl-acrylate plastic, polyacrylonitrile plastic, vinylite plastic, saran plastic, polytetrafluoroethylene plastic, polytrifluorochloroethylene plastic, polycaprolactam plastic, polyester plastic, urea formaldehyde plastic, polyurethane plastic, isotactic polypropylene plastic, nylon plastic, rayon plastic, polyamide plastic, phenolic plastic, silicone plastic, silk fiber, cotton fiber, cellulose fiber, wool fiber, animal skin, animal intestinal tissue, animal connective tissue, metallic fiber, mineral fiber and mixtures thereof.

4. A glove according to claim 3, wherein the first material comprises: a structural material selected from the group consisting of latex rubber, cis-1,4-polyisoprene rubber, cis-polybutadiene rubber, neoprene rubber, and nitrile rubber, silicone rubber case-hardened rubber, isobutylene-isoprene 1. butyl rubber, butadieneacrylonitrile 1. nitrile rubber, styrene-butadiene rubber, ethylene-propylene copolymer, ethylene-propylene diene terpolymer, polyisobutylene, chlorosulphonated

polyeten, ester-type urethan rubber, polychlormethyloxyran epichlorhydrin rubber, epichlorhydrin copolymer with ethyleneoxydichlormethyloxyran copolymer, and mixtures thereof; and wherein the second material comprises: a structural material selected from the group consisting of cellulose **acetate** plastic, **vinyl** plastic, polyethylene plastic, polypropylene plastic, polyvinyl chloride plastic, **polyvinyl acetate** plastic, polystyrene plastic, **polymethyl** methylacrylate plastic, polyacrylonitrile plastic, vinylite plastic, saran plastic, polytetrafluoroethylene plastic, polycaprolactam plastic, rayon plastic, polytrifluorochloroethylene plastic, nylon plastic, polyester plastic, urea formaldehyde plastic, polyurethane plastic, isostactic polypropylene plastic, polyamide plastic, phenolic plastic, silicone plastic, silk fiber, cotton fiber, plant fiber, wool fiber, animal skin, animal intestinal tissue, animal connective tissue, metallic fiber, mineral fiber, and mixtures thereof.

5. A glove according to claim 1, wherein the antiseptic is selected from the group consisting of chlorhexidine gluconate, chlorhexidine acetate, chlorhexidine hydrochloride, octoxynol, nonoxynol-9, methanol, ethanol, isopropanol, allyl alcohol, rubbing alcohol NF, sodium hypochlorite, potassium hypochlorite, calcium hypochlorite, magnesium hypochlorite, sodium dichloroisocyanurate, sodium perborate NF, sodium hydroxide, potassium hydroxide, magnesium hydroxide, calcium hydroxide, ammonia, ammonium hydroxide, lithium hydroxide, barium hydroxide, silver hydroxide, sodium tetradecyl sulfate, sulfur dioxide, pentationic acid, colloidal sulfur, sulfur, sulfurated potash, sublimed tyrothricin, hexachlorophene, hypochlorous acid, acetic acid, hydrochloric acid, sulfuric acid, sodium acetate, aluminum acetate, acetarsons, aluminum subacetate, cadmium sulfide, selenium sulfide, bacitracin, coilstin, chloramphenicol, tetracycline, erythromycin, gentamycin, tobramycin, mafenide acetate, neomycin sulfate, sulfisoxazole diolamine, sulfacetamide sodium, gentamycin sulfate, amphotericin B, calomel, chiniofon, creosote, diiodohydroxyquin, eucalyptol, eucalyptus oil, glycobarsol, gramicidin, hexyl resorcinol, methylene blue, peppermint oil, phenylethyl alcohol, phenyl salicylate, methyl salicylate, pine tar, pine oil NF, alpha-terpineol, borneol, fenchyl alcohol, o-methylchavicol, **polymixin** B sulfate, salicylic acid, trichloroacetic acid, benzoic acid, pyrogallol NF X, pyrogallol acid, sodium benzoate, boric acid, sodium borate, lactic acid, sodium lactate, ohiofamine, chloramine T, silver nitrate, ammoniacal silver nitrate solution, eugenol, elemental iodine, sodium iodide, potassium iodide, calcium iodide, ammonium iodide, silver iodide, colloidal silver iodide in gelatin, silver lactate, ferrous iodide, mercuric iodide red, mercuric oxide red, strontium iodide, lithium iodide, magnesium iodide, zinc iodide, silver iodide, selenium iodide, thymol iodide NF X, dithymol diiodide, povidone-iodine, iodoform, iodol, iodopyrrol, chlorinated lime, potassium bromide, sodium bromide, merbromin NF, sodium fluoride, potassium fluoride, phenyl mercuric acetate, potassium mercuric iodide, proflavine hemisulfate, 3,6-diaminoacridine bisulfate, formaldehyde, glutaraldehyde, paraformaldehyde, butyl hydroxybenzoate, mercurous chloride, iodochlorhydroxyquin, zinc nitrate, zinc sulfate, cadmium sulfate, thimerosal NF, zinc oxide, zinc acetate, zinc chloride, silver nitrate, silver sulfadiazine, hydrogen peroxide, urea hydrogen peroxide, hydrogen peroxide carbamide, benzoyl peroxide, calcium peroxide, magnesium peroxide, barium peroxide, strontium peroxide, sodium peroxide, potassium perchlorite, sodium perchlorite, calcium perchlorite, magnesium perchlorite, zinc perchlorite, zinc peroxide, zinc carbonate, zinc hydroxide, zinc sulfate, succinyl peroxide, succinylchlorimide NF IX, N-Chlorosuccinimide, potassium permanganate, sodium chlorate, potassium chlorate, phenol, camphorated phenol, phenol glycerin, chloroxylenol, 4-chloro-3,5-xyleneol, sodium phenolate, domiphen bromide, salicylic acid, bismuth-formic-iodide, bismuth subgallate, bacitracin zinc, **sodium lauryl sulfate**, carbamide peroxide, oleic acid-iodine, pipetonyl butoxide, sodium peroxyborate monohydrate, ammonium ichthosulfonate,

eucalyptol, menthol, Witch Hazel, camphor, tannic acid, chloroquinaldol, nalidixic acid, zinc phenolsulfonate, zinc sulfocarbolate, hydroxynalidixic acid, pipemidic acid, norfloxacin, norfloxacin hydrochloride, 8-hydroxyquinoline sulfate, sodium phenolate, thyme oil, o-cresol, m-cresol, metacresylacetate, p-cresol, cresol NF, 4-chloro-m-cresol, 4-chloro-3,5-xylenol, saponified cresol solution NF, methylphenol, ethyl phenol, other alkyl phenols, o-phenyl phenol, other aryl phenols, bisphenols, phenyl-mecuric chloride, phenylmercuric borate, resorcinol, resorcinol monoacetate NF, orthophenylphenol, chloroxylenol, hexylresorcinol, parachlorophenol, paratertiary-amyphenol, thymol, chlorothymol NF, butylparaben, ethylparaben, methylparaben, propylparaben, triclosan, bithionol NF, o-benzyl-p-chlorophenol, hexachlorophene, poloxamer 188, a benzalkonium chloride wherein the alkyl groups attached to the nitrogen represent an alkyl from CH.sub.3 to C.sub.18 H.sub.37, triclobisonium chloride, undecylium chlorideiodine, coal tar solution, furazolidone, nifuroxime, nitrofurazone NF, nitromersol NF, oxychlorosene, sodium oxychlorosene, parachlorophenol NF, camphorated parachlorophenol NF, phenylmercuric nitrate NF, gentian violet USP, hexamethylpara-rosaniline chloride, rosaniline chloride, pentamethylpararosaniline chloride, methylrosaniline chloride, tetramethylpararosaniline chloride, nonylphenoxypolyethoxyethanol, methoxypolyoxyetheneglycol 550 laurate, oxyquinoline benzoate, p-triisopropylphenoxypolyethoxy-ethanol, halazone NF, dichloramine-T, benzethonium chloride, econazole, cetylpyridinium chloride, methylbenzethonium chloride, cetyldimethylbenzylammonium chloride, dichlorobenzalkonium chloride, domiphen bromide, triclocarban, clotrimazole, ciclopirox olamine, undecylenic acid, miconazole, tolnaftate, acriflavine, euflavine, 3,6-diamino-10-methylacridium chloride, 3,6-diamino-acridine, acid acriflavine, 5-aminoacridine hydrochloride monohydrate, malachite green G, dodecyltrimethylammonium bromide, tetradecyltrimethyl-ammonium bromide, dequalinium chloride BP, dibromopropamidine isethionite, hexadecyltrimethylammonium bromide, chloroazodin NF X, N-chloro-p-toluenesulfonamidosodium, 4-[(dichloroamino)sulfonyl]-benzoic acid, methenamine, methenamine mandelate, methenamine hippurate, octoxynol 9, phenazopyridine hydrochloride, 9-aminoacridine hydrochloride, bismuth tribromophenate, p-tert-butylphenol, cetyldimethylethylammonium bromide, chlorothymol, cloflucaban, chlorophene, chloroxine, 8-hydroxyquinoline, merbromin, mercuric oxide yellow, ammoniated mercury, p-tert-pentylphenol, phenylmercuric acetate, phenylmercuric nitrate, propylene oxide, zinc pyrithione, triclocarban, zinc bacitracin, chlortetracycline hydrochloride, calcium chlortetracycline, oxytetracycline hydrochloride, beta-propiolactone, acyclovir, acyclovir sodium, amantadine hydrochloride, cytarabine, idoxuridine, interferon, gamma interferon, ribavirin, rifampin, suramin, trifluridine, vidarabine, zidovudine, methisazone, tumor necrosis factor, ampicillin, ansamycin, (E)-5-(2-bromovinyl)-2'-deoxyuridine, butylated hydroxytoluene, castamospermine, dextran sulfate, dideoxycytidine, dideoxyadenosine, dideoxylthymine, Peptide-T, dihydromethylpyridinylcarbonyloxazidodideoxy thymidine, ganciclovir, 2'-fluoro-2'-deoxy-5-iodo-ara C, phosphonoformate, rimantadine hydrochloride and mixtures thereof.

6. A glove according to claim 1, wherein the non-liquid antiseptic composition contains a liquid component selected from the group consisting of water, methanol, ethanol, isopropanol, propanol, allyl alcohol, butanol, isobutanol, sec-butanol, tert-butanol, benzyl alcohol, 2-methoxyethanol, 2-ethoxyethanol, 2-octyl dodecanol, nonoxynol-9, n-octyl alcohol, glycerol, propylene glycol, a polyethylene glycol of about 150 to about 700 molecular weight, urea, acetone, methyl ethyl ketone, ethyl ketone, methyl isopropyl ketone, 2-pentanone, ethyl acetate, 2-methoxyethyl acetate, ethyl propionate, ethyl butyrate, ethyl valerate, methyl acetate, propyl acetate, isopropyl acetate, 2-ethoxyethyl acetate, butyl acetate, sec-butyl acetate, tert-butyl acetate, amyl acetate, pentyl acetate, isopentyl acetate, benzyl acetate, mineral oil, silicone oil, hexamethyl disiloxane, glycerol trioctanoate, decyl oleate, cetearyl isononanoate, dimethicone,

perfluoropolymethyisopropyl ether of about 1500 to about 8800 molecular weight, olive oil, cottonseed oil, corn oil, soybean oil, wheat germ oil, linseed oil, pine oil, almond oil, macadamia oil, coconut oil, jojoba oil, peanut oil, persia oil, castor oil, cod liver oil, shark liver oil, mink oil, squalene and mixtures thereof.

7. A glove according to claim 1, wherein the non-liquid antiseptic composition contains a surface-active agent to facilitate the coating of the object with the non-liquid antiseptic composition, the surface active agent selected from the group consisting of dodecyldimethylamine oxide, lauryldimethylamine oxide, stearic acid, dibutyl adipate, octyl stearate, sodium cetearyl stearate, isopropyl myristate, palmitic acid, stearyl alcohol, cetyl alcohol, colloidal magnesium aluminum silicate, caprylic triglyceride, captic triglyceride, cetostearyl alcohol, decyl-beta-D-glucopyranoside, nonyl-beta-D-glucopyranoside, octyl-beta-D-glucopyranoside, triethanolamine stearate, heptyl-beta-D-glucopyranoside, hexyl-beta-D-glucopyranoside, dodecyl-beta-D-maltoside, decyl-beta-D-maltoside, **sodium dodecylsulfate**, sodium oleate, potassium laurate, sodium laurate, **sodium lauryl sulfate**, glycerol monostearate, propylene glycol monostearate, bis(2-ethylhexyl)sodium sulfosuccinate, N-octylsulfobetaine, propylene glycol monolaurate, N-dodecylsulfatobetaine, octyl-beta-D-thioglucopyranoside, heptyl-beta-D-thioglucopyranoside, N-dodecyl-N,N-dimethylglycine, cetyl alcohol, N-decylsulfatobetaine, digitonin, N-hexyldecylsulfatobetaine, N-tetradecylsulfatobetaine, dioctyl sodium sulfosuccinate, N,N-bis(3-D-gluconamidopropyl)-cholamide, sodium deoxycholate, N,N-bis(3-D-gluconamidopropyl)-deoxycholamide, glycerol monostearate, sodium taurodeoxycholate, sodium cholate, sodium taurocholate, sodium glycocholate, cetyltrimethylammonium bromide, 3-[(3-cholamidopropyl)dimethylammonio]-1-propanesulfonate, 3-[(3-cholamidopropyl)dimethylammonio]-2-hydroxypropane-1-sulfonate, octanoyl-N-methylglucamide, nonanoyl-N-methylglucamide, decanoyl-N-methylglucamide, nonyl-N-methylglucamide, lecithin, lysolecithin, nonaethylene glycol monododecyl ether, nonaethylene glycol octylphenol ether, nonaethylene glycol octylcyclohexyl ether, heptaethylene glycol octylphenyl ether, heptaethylene glycol octylcyclohexyl ether, polyoxyethylene (10) monolauryl ether, polyoxyethylene (8) isotridecyl ether, polyoxyethylene (10) isotridecyl ether, polyoxyethylene (15) isotridecyl ether, polyoxyethylene (9) lauryl ether, polyoxyethylene (23) lauryl ether, octaethylene glycol monododecyl ether, nonaethylene glycol monododecyl ether, polyethylene polypropylene glycol, sorbitan monopalmitate, sorbitan monooleate, sorbitan monostearate, polyoxyethylene sorbitan monolaurate, polyoxyethylene sorbitan monooleate, polyoxyethylene-4-lauryl ether, a polyethylene glycol of about 150 to about 600 molecular weight, polyoxyethylene glycol 400 molecular weight, polyoxyethylene glycol 1540 molecular weight, polyoxyethylene glycol 4000 molecular weight, polyoxyethylene glycol 8000 molecular weight, polyethylene glycol 400 monostearate, polyoxyethylene-4-sorbitan monolaurate, polyoxyethylene-20-sorbitan monooleate, polyoxyethylene-20-sorbitan monopalmitate, polyoxyethylene-20-sorbitan monolaurate, polyoxyethylene-40-stearate, dimethicone, simethicone, dimethylpolysiloxane, sorbitan trioleate, sorbitan tristearate, propylene glycol monostearate, sorbitan sesquioleate, diphenylmethylsilicone, lauryldimethylbenzylammonium chloride, a perfluoropolymethylisopropyl ether of about 1500 to about 6600 molecular weight, acacia, type A gelatin, type B Gelatin, egg yolk phospholipids, soybean phospholipids, cholesterol, colloidal aluminum silicate, colloidal magnesium hydroxide, and mixtures thereof.

8. A glove according to claim 1, wherein the non-liquid antiseptic composition contains an algesic agent to increase the pain sensation perceived from the hand, to alert the individual when the hand has been wounded, the algesic agent selected from the group consisting of formic acid, acetic acid, hydrochloric acid, phosphoric acid, sodium hydrogen

phosphate, sodium phosphate, potassium hydrogen phosphate, potassium phosphate, citric acid, sodium hydrogen citrate, sodium citrate, sulfuric acid, sodium hydrogen sulfate, **sodium sulfate**, sodium hypochlorite, potassium hypochlorite, bradykinin, substance P, bee venom, wasp venom, ant venom, potassium chloride, potassium citrate, potassium sulfate, potassium phosphate, potassium carbonate, potassium bromide, potassium iodide, potassium fluoride, potassium hydroxide, potassium nitrate, and mixtures thereof.

11. A glove according to claim 1, wherein the non-liquid antiseptic composition further contains a viscosity-modifying **polymer** as a means for increasing the viscosity of the non-liquid antiseptic composition, the viscosity-modifying **polymer** selected from the group consisting of gum arabic, xanthan gum, gum acacia, gum tragacanth, agar, glycyrrhiza, sodium alginate, bentonite, cellulose, methyl cellulose, carboxymethyl cellulose sodium, glycerol, propylene glycol, pyroxylin, polyoxyethylene glycols of about 150 to about 6000 molecular weight, gelatin, dimethicone of about 100 to about 3000 centistokes viscosity, simethicone, dimethylpolysiloxane, perfluoropolyethylisopropyl ether of about 1500 to about 6600 molecular weight, starch, and mixtures thereof.

12. A glove according to claim 1, wherein a structural connection is made by using a third material to connect the first material to the second material, the third material comprising: a structural material selected from the group consisting of latex rubber, cis-1,4-polyisoprene rubber, cis-polybutadiene rubber, neoprene rubber, nitrile rubber, silicone rubber, case-hardened latex rubber, isobutylene-isoprene 1. butyl rubber, butadieneacrylonitrile 1. nitrile rubber, styrene-butadiene rubber, ethylene-propylene copolymer, ethylene-propylene diene terpolymer, polyisobutylene, chlorosulphonated polyethylene, ester-type urethane rubber, polychloromethoxyran epichlorhydrin rubber, epichlorhydrin copolymer with ethyleneoxydichloromethoxyran copolymer, cellulose **acetate** plastic, **vinyl** plastic, polyethylene plastic, polypropylene plastic, polyvinyl chloride plastic, **polyvinyl acetate** plastic, polystyrene plastic, **polymethyl** methylacrylate plastic, polyacrylonitrile plastic, vinylite plastic, saran plastic, polytetrafluoroethylene plastic, polytrifluorochloro-ethylene plastic, nylon plastic, rayon plastic, polycaprolactam plastic, polyester plastic, urea formaldehyde plastic, polyurethane plastic, isostatic polypropylene plastic, polyamide plastic, phenolic plastic, silicone plastic, silk fiber, cotton fiber, plant fiber, wool fiber, animal skin, animal intestinal tissue, animal connective tissue, metallic fiber, mineral fiber, a **glue** comprising at least one of the aforementioned structural materials, and mixtures thereof.

L71 ANSWER 2 OF 8 USPTFULL

AN 93:65090 USPTFULL

TI **Article** comprising a water soluble bag containing a multiple use amount of a **pelletized** functional material and methods of its use

IN Gladfelter, Elizabeth J., Falcon Heights, MN, United States  
Slocumb, Sheryl D., New Brighton, MN, United States

PA Ecolab Inc., St. Paul, MN, United States (U.S. corporation)

PI US 5234615 19930810

AI US 1992-867285 19920409 (7)

RLI Continuation of Ser. No. US 1990-611668, filed on 13 Nov 1990, now abandoned which is a division of Ser. No. US 1990-515361, filed on 26 Apr 1990, now patented, Pat. No. US 5078301 which is a continuation of Ser. No. US 1989-368085, filed on 16 Jun 1989, now abandoned which is a continuation of Ser. No. US 1987-104458, filed on 2 Oct 1987, now abandoned

DT Utility

EXNAM Primary Examiner: Albrecht, Dennis

LREP Merchant, Gould, Smith, Edell, Welter & Schmidt  
CLMN Number of Claims: 45  
ECL Exemplary Claim: 1,37  
DRWN 3 Drawing Figure(s); 1 Drawing Page(s)  
LN.CNT 1779

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB An article comprising a water soluble container containing a multiple use amount of a **pelletized** functional composition such as a fabric treatment composition, a warewashing composition, a laundry composition, a pot and pan presoak composition, a silverware presoak composition, a floor cleaner composition, a rinse additive composition, a disinfectant composition, a sanitizer composition, a general purpose cleaner composition, etc. The article may be optionally enclosed in a water impervious outerwrap.

A method for using the article by placing the article inside a dispenser wherein the article is contacted with water having a sufficient temperature and pressure to dissolve the water soluble bag and the **pelletized** functional material contained therein in order to form a solution.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

TI **Article** comprising a water soluble bag containing a multiple use amount of a **pelletized** functional material and methods of its use

AB An article comprising a water soluble container containing a multiple use amount of a **pelletized** functional composition such as a fabric treatment composition, a warewashing composition, a laundry composition, a pot and pan presoak composition, a silverware presoak composition, a floor cleaner composition, a rinse additive composition, a disinfectant composition, a sanitizer composition, a general purpose cleaner composition, etc. The article may be optionally enclosed in a water impervious outerwrap.

AB A method for using the article by placing the article inside a dispenser wherein the article is contacted with water having a sufficient temperature and pressure to dissolve the water soluble bag and the **pelletized** functional material contained therein in order to form a solution.

SUMM The invention relates to an article comprising a water soluble bag containing a multiple use amount of a **pelletized** water soluble or dispersible functional material. A fabric treatment composition, warewashing composition, a laundry composition, a pot and pan presoak composition, a silverware presoak composition, a floor cleaner composition, a rinse additive composition, a disinfectant composition, a sanitizer composition, a general purpose cleaner composition, etc. all can be packaged and dispersed from the water soluble bag.

SUMM More particularly, the invention relates to an article comprising a water soluble bag- containing a multiple use amount of a **pelletized** functional composition which can be used in a dispenser wherein the water soluble bag is dissolved upon contact with a spray or stream of water from the dispenser exposing the **pellets** to the water. Upon contact with water, the **pellets** in the dispenser dissolve over a period of time, forming a use solution.

SUMM Single use domestic detergent .packets comprising powdered or **pelletized** detergent within a water soluble single use packet are known in the art. See Dunlop, U.S. Pat. No. 3,198,740. Such packets are intended for direct insertion into the wash water contained in a washing machine and are not intended for use in a dispenser. Each packet equals one use or application. In addition, such packets are intended for domestic rather than institutional use.

SUMM I have found that the drawbacks of powder use generally can be solved by an article of manufacture comprising a sealed water soluble container enclosing as little as about 200 grams, 450 grams, of a

**pelletized** functional composition.

- SUMM I have found the drawbacks of powdered warewashing detergent use can be solved by an article of manufacture comprising a sealed water soluble container enclosing typically at least about 900 grams of a **pelletized** warewashing functional composition.
- SUMM The amount of **pelletized** composition contained in the article can vary according to a number of factors including but not limited to the following: the dispenser size, the intended use of the solution formed, the **pellet** composition, etc.
- DRWD FIG. 1 is a front perspective view with portions thereof broken away for ease of installation of a dispenser in which is situated an article comprising a water soluble bag containing **pelletized** functional material.
- DRWD FIG. 2 is a front elevational view with portions thereof broken away of the article comprising a water soluble bag containing a functional **pelletized** material shown in FIG. 1 which further comprises a moisture impervious outerwrap.
- DRWD FIG. 3 is a front elevational view taken in section generally through the center of the dispenser in which is situated an article which is resting upon **pelletized** functional material which was previously enclosed in a water soluble container which has dissolved.
- DETD Referring to the drawings, wherein, like numerals represent like parts throughout the several views; there is generally designated an article 16 comprising a sealed water soluble bag 3 containing a **pelletized** functional composition 4 situated in a dispenser 5.  
(See FIG. 1.)
- DETD There is also generally designated an article 16 comprising a sealed water soluble bag 3 containing a **pelletized** functional composition 4 further contained within a removable water impervious outerwrap 2. (See FIG. 2.)
- DETD Polyvinyl alcohol, **polyvinyl acetate**, methyl cellulose, hydroxyethyl cellulose, carboxymethyl cellulose, sodium carboxymethylhydroxyethyl cellulose, polyvinyl pyrrolidone, poly(alkyl)oxazoline, and film-forming derivatives of polyethylene glycol.
- DETD Polyvinyl alcohol which is preferred is an excellent film forming material, and has good strength and pliability under most conditions. Commercially available polyvinyl alcohol compositions for casting as films vary in molecular weight and degree of hydrolysis. For most film applications, molecular weights in the range of about 10,000 to about 100,000 are preferred. Hydrolysis is the percent by which acetate groups of the polyvinyl alcohol have been substituted with hydroxyl groups. For film applications, the range of hydrolysis typically is about 70% up to 100%. Thus, the term "polyvinyl alcohol" usually includes **polyvinyl acetate** compounds.
- DETD It is also important to select a water soluble film that does not react with the **pellets** 4 contained in the water soluble bag 3 formed therefrom. Other factors which should be considered when choosing a water soluble film to form the water soluble bag 3 include the following: the effect of the water soluble film on equipment including pumps, pipes and nozzles; the effect of the water soluble film on waste water; the toxicity of the water soluble film; the printability of the water soluble film; and properties which allow the water soluble film to be used on automated bag-making equipment (i.e. sealability, tensile strength and tear strength).
- DETD The water soluble bag 3 is filled by pouring the weighed **pelletized** functional material 4 into the previously prepared water soluble bag 3 and finally heat sealing the fourth edge.
- DETD Thus the article 16 comprising the sealed water soluble bag 3 containing the **pelletized** functional composition 4 should be protected from atmospheric humidity. The article 16 can be placed in the moisture impervious outerwrap 2 described further below.
- DETD The water soluble bag 3 can be of whatever dimensions necessary in order

to enclose the desired amount of **pelletized** functional composition.

DETD However, as currently envisioned with about 200 to 450 grams as the expected minimum amount of **pelletized** composition that will be enclosed, the expected internal bag dimensions would typically be about 4 to 5 inches wide and about 5 to 7 inches long.

DETD The water soluble bag 3 should have a minimum capacity of about 200 grams to 900 grams for reasons of customer convenience depending upon the nature of the **pellet** 4.

DETD The amount of **pelletized** composition 4 that the water soluble container 3 would contain is dependent to an extent upon the **pelletized** composition and its intended use.

DETD A water soluble container 3 intended for containing a **pelletized** silicate laundry detergent or a **pelletized** laundry softening agent should have a typical capacity of about 450 grams.

DETD A water soluble container 3 intended for containing a **pelletized** silicate warewashing composition or a **pelletized** caustic warewashing composition should have a typical capacity of about 900 grams.

DETD A water soluble container 3 intended for containing a **pelletized** presoak composition, a **pelletized** general purpose composition or a **pelletized** hard surface cleaner should have a typical capacity of about 200 grams.

DETD Whenever a warewashing **pelletized** functional composition 4 is enclosed by the water soluble container 3, the water soluble container typically encloses at least about 900 grams of the **pelletized** functional composition 4.

DETD The water soluble bag 3 should have a maximum capacity of about 3 kg-9 kg for reasons of customer convenience. Preferably, the water soluble bag 3 should have a capacity of about 1 kg-5 kg most preferably about 2-3 kg, depending upon the **pelletized** composition and its intended use.

DETD The water soluble bag containing **pelletized** warewashing composition should have a capacity of about 900 grams-9 kg for reasons of customer convenience.

DETD A typical water soluble bag 3 containing approximately four pounds of **pelletized** functional material 4 may have overall dimensions of about 8 inches by about 12 inches, with sealed margins of about 1/4 to 1/2 inches.

DETD A typical water soluble bag 3 containing approximately six pounds of **pelletized** functional material 4 may have inside dimensions of about 7 1/2 inches by about 14 inches, with sealed margins of about 1/4-1/2 inches.

DETD **Pelletized Functional Material**

DETD The water soluble bag 3 contains enough **pellets** 4 in order to provide for multiple uses when the water soluble bag 3 is placed in a dispenser 5 and contacted with water.

DETD The water soluble bag 3 contains a sufficient amount of **pellets** 4 to provide for at least about 2 uses, preferably about 4 to 20 uses for reasons of customer convenience and most preferably about 8 to 12 uses for reasons of customer convenience. Besides being dependent upon the amount of **pelletized** material, the number of uses is also dependent upon the water temperature, water pressure, **pellet** composition, water flow rate, water soluble bag composition and length of time the **pellets** are contacted with water during each use.

DETD The mass of each **pellet** 4 typically ranges from about 2 to 30 grams, preferably about 5 to 15 grams for reasons of dissolution, and most preferably about 7 to 8 grams for reasons of preferred dissolution rate. If the 4 **pellets** are too large the rate of dissolution will be too low. If the rate of dissolution is too low the solution formed will have too low of a concentration of dissolved functional material. If the **pellets** 4 are too small the rate of dissolution will be too high. If the rate of dissolution is too high the solution formed will have too high of a concentration of dissolved functional material. Typically, the detergent solution is transferred to a washing or cleaning apparatus which has a concentration monitoring

device which controls the length of time water is sprayed through the nozzle 11 onto the **pelletized** material 4. If the solution enters at the machine in a highly concentrated form, the concentration could reach too high of a level before the sensor would detect the concentration and shut off the flow of water to the dispenser 5. In addition, concentrations that are too high could affect product performance.

DETD A **pellet** 4 can have the following dimensions: a width ranging from about 5 to 30 mm, a height ranging from about 10 to 80 mm, and a depth ranging from about 10 to 30 mm. Preferably each **pellet** has about a width of about 19 mm, a height of about 30 mm and a width of about 15 mm for preferred dissolution.

DETD As used herein, the terms "**pellet**" 4, "**pelletized** functional material" 4, and "**pelletized** functional composition" are used interchangeably. The terms also include but are not limited to the following: briquettes, tablets, **pellets**, nuggets, etc.

DETD The shape of the **pellets** 4 used in the water soluble bag 3 of the present invention can vary. The shape of a **pellet** 4 can include any regular geometric shape including but not limited to the following: spherical, pyramidal, cubic, oblate spheroid, prismatic, cylindrical, etc.

DETD Preferably, the **pellets** 4 used in the water soluble bag 3 of the present invention are spheroid shaped for reasons of manufacturing ease.

DETD In order to protect the article 16 of the present invention which comprises a water soluble bag 3 containing a multiple use amount of a **pelletized** functional material 4 during storage, shipping and handling, a water impervious outerwrap 2 can be provided to prevent damage from atmospheric moisture such as high humidity, rain and dew and from accidental contact with water by splashing or wet hands. This water impervious outerwrap 2 can be provided for either an individual article 16 or groups of articles 16, whichever appears to be most desirable for the individual case. Preferably, the water impervious outerwrap 2 is provided individually for each article 16 for reasons of customer safety and convenience and product protection. Once the water impervious outerwrap 2 is removed, the article 16 should either be protected from water contact or promptly inserted into the dispenser 5.

DETD A polyethylene water impervious outerwrap 2 having the following dimensions can be used to enclose a water soluble bag 3 containing 4 lbs. of **pelletized** functional composition 4.

DETD The enclosed **pelletized** functional material 4 is typically used by placing the article 16 inside the dispenser 5 after removing the water impervious outerwrap 2. The water soluble bag 3 of the present invention contains too large of an amount of **pelletized** functional material 4 to be placed directly in a warewashing or cleaning apparatus for a single use cycle.

DETD The perforated grate 6 serves to support the water soluble bag 3 containing the **pellets** 4 within the dispenser 5.

DETD The perforated grate 6 is preferably flat in order to facilitate contact of the water soluble bag 3 and **pellets** 4 with the water being sprayed from below.

DETD The perforated grate 6 contains a number of openings 7. The openings 7 must be of a sufficient size and number to allow an adequate amount of water to spray through the perforated grate 6 in order to dissolve the water soluble bag 3 and the **pellets** 4 contained therein. To facilitate dispensing it is preferable that the perforated grate 6 contain as many openings 7 as possible in order to facilitate contact of water from the nozzle 11 below with the **pellets** 4 and the water soluble bag 3 which are supported by the perforated grate 6. The openings 1 should not be so numerous that the perforated grate 6 is too weak to support the weight of the water soluble bag 3 and **pellets** 4 or to permit the **pellets** to pass through the grate openings.

DETD The openings 7 should be smaller than the **pellets** 4 contained in water soluble bag 3 so that the **pellets** 4 do not fall

through the openings 7 in perforated grate 6 as soon as the water soluble bag 3 dissolves.

DETD A safety grate 9 is typically situated below the perforated grate 6. The safety grate 9 serves to collect any subdivided **pellet 4** particles which have been eroded to a size small enough to fall through an opening 7 contained in perforated grate 6. The safety grate 9 typically has a size such that a particle comprising about 5 mm.times.5 mm or larger cannot fit through the openings 10 contained in safety grate 9.

DETD The safety grate 9 can comprise a number of materials including but not limited to the following: plastic, metal, and **wire** mesh.

DETD The safety grate 9 prevents **pellet 4** particles from entering and clogging the line 13 leading from the dispenser 5 to the unit such as a warewashing machine that uses the use solution. Water which has been sprayed through nozzle 11, through perforated grate 6 and onto the water soluble bag 3 and **pellets 4** supported by perforated grate 6 dissolves the **pellets 4** resulting in the formation of a use solution. The use solution thus formed flows back down through the perforated grate 6 and safety grate 9 and out of the dispenser 5 through line 13. **Pellet 4** particles which have fallen onto safety grate 9 are dissolved upon contact with the use solution as it flows out of the dispenser 5.

DETD A nozzle 11 or other fluid dispersing means is typically positioned such that water or other dissolving fluid can be directed onto the water soluble bag 3 and **pellets 4** resting on the perforated grate 6 in order to form a solution.

DETD The rate of dissolution of the water soluble bag 3 and the **pellets 4** contained therein is dependant upon a number of factors including the water temperature and the pressure of the water sprayed upon the water soluble bag 3 and the **pellets 4** contained therein. The higher the water pressure the higher the dissolution rate of the water soluble bag 3 and **pellets 4**. Likewise, the higher the water temperature the higher dissolution rate of the water soluble bag 3 and **pellets 4**. The size of the **pellet 4** itself also affects the dissolution rate.

DETD The smaller the **pellet 4** the higher its dissolution rate. Conversely, the larger the **pellet 4** the lower its dissolution rate.

DETD A **pellet's 4** dissolution rate is also affected by whether the **pellet 4** has been previously wetted. If a **pellet 4** has been wetted during a pervious solution formation cycle then it will have a higher dissolution rate during subsequent solution formation cycles.

DETD The dissolution rate of a **pellet 4** is also affected by the **pellet's 4** density. The higher the density of a **pellet 4**, the slower it dissolves.

DETD The **pellets 4** used in the water soluble bag 3 of the present invention can have a density ranging from about 1.0 to 3.0 gm/ml, preferably about 1.7 to 2.0 gm/ml for reasons of dispensing and most preferably 1.8 to 1.9 gm/ml for reasons of friability and dispensing.

DETD A warewashing **pellet 4** for use in the article 16 of the present invention has a dissolution rate such that it does not completely dissolve in less than about 7-10 minutes when contacted with water having a temperature of the range of water typically used in consumer dishwashers.

DETD The rate of dissolution is also dependent upon the composition of the water soluble bag 3 itself and upon the compositions of the **pellets 4** contained therein.

DETD Preferably, the **pelletized** functional material is contacted with a water spray having a sufficient temperature and pressure in order to form a concentrate which can be dispensed to its use location within about 0.5-5 minutes. Preferably, the dispensing time necessary in order to achieve the desired concentration of functional material at the use location is less than 3 minutes.

DETD The temperature of the water sprayed through the nozzle 11 onto the article 16 can vary depending upon the composition of the water soluble container 3 and the **pelletized** functional material 4.

- DETD Preferably, the water has a minimum temperature of about 34.degree. F. in order to dissolve the water soluble container. The minimum water temperature is also dependent upon the composition of the **pelletized** functional material.
- DETD The contact of water with the **pelletized** functional material 4 within the dispenser 5 results in the formation of a solution. Such solution is directed by means of a line 13 into a washtank, bucket or wherever the solution is needed.
- DETD An ionic sensor or other concentration monitoring device can be used to determine the concentration of solution formed by action of the water on the **pellets** 4 contained within the dispenser 5. The ionic sensor serves to regulate the length of time water is sprayed through the nozzle 11, thus insuring a high accuracy with regards to the functional material solution concentration.
- DETD The dispenser 5 used to dissolve the article 16 of the present invention can be used by itself in order to form a solution from the **pellets** 4 contained in the water soluble bag 3. Alternatively, the dispenser 5 can be mounted directed onto a machine such as a warewashing machine, laundry machine, etc. which the dispenser 5 is being used in conjunction with. Alternatively, the dispenser 5 can be situated on the floor next to the machine it is being used in conjunction with, or mounted on a nearby wall.
- DETD **Pelletized Functional Composition**
- DETD The article 16 of the present invention can contain a multiple use amount of a **pelletized** functional material 4 including but not limited to a fabric treatment composition, a warewashing composition, a laundry composition, a pot and pan cleaner or presoak composition, a silverware cleaner or presoak composition, a floor cleaner composition, a rinse additive composition, a disinfectant composition, a general purpose cleaner composition, etc. The **pelletized** materials of the invention are room temperature solids. The materials are solidified by a variety of mechanisms, including compressive molding, compressive **pelletizing**, casting, hydration hardening, the user of organic hardening agents, etc.
- DETD Formula I comprises a detergent **pellet** whereas Formula II comprises a fabric softening **pellet** which also serves to lower the pH (i.e. acidify or sour) the water in which the **pellet** is dissolved.

DETD

## FORMULA I

SILICATE LAUNDRY DETERGENT **PELLET**

	Narrow	Preferred	Broad
1. Alkali metal silicate			
	48-52	30-60	5-90
2. Alkali metal hydroxide			
	20-50	20-60	0-80
3. Sequestering agent			
	15-30	10-60	1-90
4. Antiredeposition agent			
	2-4	2-8	0-10
5. Dye	0.018-0.022	0.005-0.05	0-0.5

## Optional Ingredients

6. Optical brightener		
	0.1-1.0	0-5
7. Nonionic surfactant		
	20-30	0-50
8. Anionic surfactant		
	5-15	0-20
9. Fragrance	0.05-0.5	0-1.0
10. Sodium carbonate		0-80
11. Water of hydration		0-30

## FORMULA II

LAUNDRY SOFTENING **PELLET**

	Narrow	Preferred Broad
1. Moderate pH acid	70-90	50-100
2. Quaternary surfactant		
20-40	10-50	50-100
3. Optical brightener	0.1-0.4	0-2
4. Fragrance	0.1-0.5	0-2
5. Iron control agents	5-15	0-20
6. Water of hydration		0-43
7. Enzyme		0-5

DETD 1(a). Laundry Composition--Formula I--Laundry Detergent **Pellet**

DETD The laundry detergent **pellet** may comprise about 0 to 100 wt-% of an alkali metal silicate, preferably about 30 to 60 wt-% for reasons of detergency and dispensing ability and most preferably about 48-52 wt-% for reasons of solubility.

DETD The laundry detergent **pellet** may comprise about 0 to 80 wt-% of a source of an alkali metal hydroxide, preferably about 20 to 60 wt-% for reasons of solubility and detergency and most preferably about 20 to 50 wt-% for reasons of effective cleaning. Suitable alkali metal hydroxides include: potassium hydroxide and sodium hydroxide.

DETD The laundry detergent **pellet** may comprise about 0 to 100 wt-% of a sequestering agent, preferably about 10 to 60 wt-% for reasons of chelating water hardness and improving soil removal and most preferably about 15 to 30 wt-% for reasons of effective sequestering. Suitable sequestering agents include but are not limited to the following: alkali metal phosphates such as pyrophosphates, tripolyphosphates, sodium aluminosilicates, sodium carbonate, and also organic sequestering agents, such as EDTA, NTA, phosphonates, polyacrylic acid, copolymers of acrylic acid, copolymers of itaconic acid, etc. Preferably the sequestering agent comprises sodium tripolyphosphate for reasons of cost.

DETD The laundry detergent **pellet** may also comprise about 0-0.5 wt-% of a dye, preferably about 0.005-0.05 wt-%, and most preferably about 0.018-0.022 wt-%.

DETD The laundry detergent **pellet** may also comprise about 0-10 wt-% of an antiredeposition agent, preferably 2-8 wt-% for reasons of suspending soil and preventing deposition on fabric and most preferably about 2-4 wt-% of an antiredeposition agent for reasons of effective soil suspension. Suitable antiredeposition agents include but are not limited to the following: substituted celluloses such as carboxymethyl cellulose, polyvinyl pyrrolidine, polymeric polycarboxylate materials, and ethoxylated amides. Preferably the antiredeposition agent comprises carboxymethyl cellulose for reasons of efficacy.

DETD The laundry detergent **pellet** may also comprise about 0-5 wt-% of an optical brightener, preferably about 0.1-1.0 wt-%.

DETD The laundry detergent **pellet** may also comprise about 0-50 wt-% of a nonionic surfactant, preferably about 10-40 wt-%, and most preferably about 20-30 wt-%. Suitable nonionic surfactants include but are not limited to the following: propoxylated and/or ethoxylated alkyl phenols, propoxylated and/or ethoxylated aliphatic alcohols and carboxylic esters. For reasons of effective detergency, low cost, ease of availability, and low foam, the preferred nonionic surfactants are ethoxylated nonyl phenols having 9-10 moles of ethoxylate and C.sub.12 -C.sub.15 linear alcohols having 7-9 moles of ethoxylate.

DETD The laundry detergent **pellet** may also comprise about 0-20 wt-% of an anionic surfactant, preferably about 5-15 wt-% for reasons of particulate soil dispersion. Suitable anionic surfactants include but are not limited to the following: linear alkyl benzene sulfonate, alcohol sulfate, alcohol ether sulfate and alpha olefin sulfonates. Preferably the anionic surfactant comprises a linear alkyl benzene sulfonate for reasons of cost and efficacy.

- DETD The laundry detergent **pellet** may also comprise about 0-80 wt-% sodium carbonate.
- DETD The laundry detergent **pellet** may also comprise about 0-1.0 wt-% of a fragrance, preferably about 0.05-0.5 wt-%.
- DETD The laundry detergent **pellet** may also comprise about 0-30 wt-% water of hydration, preferably about 0 to 15 wt-% for reasons of ensuring a strong **pellet** that resists breakage and dusting and concentrating the product actives.
- DETD The following Example demonstrates the good dissolution rate of a water soluble bag of the present invention containing a **pelletized** silicate laundry detergent functional composition. A water soluble bag having the following dimensions: 7 1/2 inches length, 10 inches width and a thickness of 1.5 mils and comprising a polyvinyl alcohol film bag purchased from Chris Craft Industries, Inc. having the properties set forth in Table A containing 3 lbs. of **pellets** is inserted into a dispenser. The silicate laundry detergent **pellets** have the following composition:
- DETD The water soluble bag containing the **pellets** is contacted with water having a temperature of 135-155.degree. F. in order to form a solution. The solution is formed and transferred to a 30 gallon tank containing 25 gallons of fresh water. By means of an ionic sensor it is determined that it takes less than about 3 minutes for the tank to reach the desired concentration.
- DETD 1(b). Laundry Composition--Formula II--Laundry Softening **Pellet**
- DETD Formula II comprises a laundry softening **pellet**.
- DETD The laundry softening **pellet** can comprise about 50-100 wt-% of a moderate pH acid, preferably about 70-90 wt-% for reasons of reducing linen pH to prevent skin irritation and enhance rinsing of water hardness salts. Suitable moderate pH acids include but are not limited to the following: ammonium silico fluoride, sodium silicofluoride, tartaric acid, citric acid, oxalic acid, sodium acid fluoride and ammonium acid fluoride. Preferably the moderate pH acid comprises ammonium silico fluoride for reasons of solubility, toxicity and cost.
- DETD The laundry softening **pellet** also comprises about 50-100 wt-%, preferably about 10-50 wt-%, and most preferably about 20-40 wt-% of a quaternary surfactant.
- DETD The laundry softening **pellet** may also comprise about 0-2 wt-% of an optical brightener, preferably about 0.1-0.4 wt-%.
- DETD The laundry softening **pellet** may also comprise about 0-2 wt-% of a fragrance, preferably about 0.1-0-0.5 wt-%.
- DETD The laundry softening **pellet** may also comprise about 0-20 wt-% of an iron control agent, preferably about 5-15 wt-% for reasons of reducing yellowing caused by iron deposits. Suitable iron control agents include but are not limited to the following: oxalic acid, citric acid, such as HEDP (hydroxyethylene diphosphonic acid), sodium or ammonium acid fluoride and organic amino polycarboxylated compounds such as nitrilotriacetic acid and ethylene diamine diacetic acid.
- DETD The laundry softening **pellet** may also comprise about 0-43 wt-% water of hydration, preferably about 0-15 wt-% for reasons of reducing the percentage of inactive materials in the formulation.
- DETD The laundry softening **pellet** may also comprise about 0-5 wt-% of an enzyme, preferably about 1-4 wt-% for reasons of protein and starch stain removal. Suitable enzymes include but are not limited to the following: amylase, protease, lipase and cellulase.
- DETD The following Example demonstrates the good dissolution rate of a water soluble bag of the present invention containing a laundry softening **pelletized** functional composition. A water soluble bag having the following dimensions: 7 1/2 inches length, 6 inches width and a thickness of 1.5 mils and comprising a polyvinyl alcohol film bag purchased from Chris Craft Industries, Inc. having the properties set forth in Table A containing 1 lb. of **pellets** is inserted into a dispenser.
- DETD The laundry softening **pellet** composition is as follows:
- DETD The water soluble bag containing the **pellets** is contacted with water having a temperature of 135-155.degree. F. in order to form a solution. The solution is transferred to a 30 gallon tank containing 25

gallons of fresh water. By means of an ionic sensor it is determined that it takes less than 3 minutes for the tank to reach the desired concentration.

- DETD We believe that a multiple use amount of a **pelletized** warewashing composition may be used in the water soluble bag of the present invention.
- DETD The **pelletized** metasilicate based warewashing composition of this invention preferably comprises about 10 to 70 wt-%, of a sequestering agent, preferably about 30 to 40 wt-% for reasons of effective sequestering of hardness ions.
- DETD The **pelletized** metasilicate based warewashing composition of this invention can comprise about 10 to 70 wt-% of an alkali metal silicate. Preferably the **pelletized** warewashing composition comprises about 30 to 60 wt-% of an alkali metal silicate for reasons of supplying alkalinity, and most preferably about 40 wt-% of an alkali metal metasilicate for reasons of supplying sufficient alkalinity.
- DETD Methods of manufacturing alkali metal silicates having various x:y mole ratios are well known as demonstrated by the general disclosure in the Kirk-Othmer Encyclopedia of Chemical Technology, 2d Ed., Vol. 18, pp. 139-141. The desired properties and benefits of the **pelletized** warewashing composition described herein can be obtained using an alkali metal silicate having an x:y ratio of about 1:1-3:1, preferably 1:1. At these ratios, the alkali metal silicate has sufficient alkaline character to clean effectively and sufficient silicon dioxide to protect aluminum, china, glassware, etc. from the etchant effect of basic components in the composition.
- DETD The **pelletized** metasilicate based warewashing composition of this invention can comprise about 0 to 10 wt-% of a secondary sequestering agent. Preferably, the **pelletized** warewashing composition comprises about 0 to 4 wt-% of an secondary sequestering agent for reasons of better product performance.
- DETD The **pelletized** metasilicate based warewashing composition of the present invention can also comprise about 0 to 60 wt-% of a filler. Preferably the **pelletized** warewashing composition comprises about 0-40 wt-% of a filler for reasons of cost, and most preferably about 18-22 wt-% for reasons of cost.
- DETD Suitable fillers include but are not limited to the following: sodium carbonate, and **sodium sulfate**.
- DETD The more fillers the **pellet** contains, the less expensive the **pellet**. Preferably, the filler comprises sodium carbonate for economic reasons and the fact that sodium carbonate services as an additional source of alkalinity.
- DETD The **pelletized** metasilicate based warewashing composition may also comprise about 0.1-10 wt-% of a bleaching source. Preferably the **pelletized** warewashing composition contains about 1-6 wt-% of a bleaching source, for reasons of detaining, and most preferably about 2-3 wt-% for reasons of cost coupled with good destaining.
- DETD Bleaches suitable for use in the **pelletized** warewashing composition include any of the well known bleaching agents capable of removing stains from such substrates as dishes, flatware, pots and pans, textiles, countertops, appliances, flooring, etc. without significantly damaging the substrate. A nonlimiting list of such bleaches include bleaches such as hypochlorites, chlorites, chlorinated phosphates, chloroisocyanates, chloroamines, etc.; and peroxide compounds such as hydrogen peroxide, perborates, percarbonates etc. Preferred bleaches include those bleaches which liberate an active halogen species such as Cl.sup.+, Br.sup.+, OCl.sup.-, or OBr.sup.- under conditions normally encountered in typical cleaning processes. Most preferably, the bleaching agent releases Cl.sup.+ or OCl.sup.-. A nonlimiting list of useful chlorine releasing bleaches includes calcium hypochlorite, lithium hypochlorite, chlorinated trisodium phosphate, sodium dichloroisocyanurate, potassium dichloroisocyanurate, pentaisocyanurate, trichloromelamine, sulfondichloro-amide, 1,3-dichloro-5,5dimethyl hydantoin, n-chlorosuccinimide, n,n'-dichloroazodicarbonimide, n,n'-chloroacetyl urea, n,n'-dichlorobiuret, trichlorocyanuric acid, and hydrates thereof.

DETD The **pelletized** metasilicate based warewashing composition of the present invention may also comprise about 0-10 wt-% of a defoaming surfactant.

DETD The **pelletized** warewashing composition may also further comprise 0-10 wt-% a dye and 0-10 wt-% fragrance.

DETD The **pelletized** functional composition of the present invention can be manufactured by a number of processes, included but not limiting to the following: a batch process and a continuous process.

DETD In the batch process, sodium metasilicate, low density tripolyphosphate, surfactant, soda ash, and dry polyacrylate are added in any order to a ribbon blender or a Nauta mixer. The last item added is the chlorine source (sodium dichloroisocyanurate dihydrate). The various dry ingredients are mixed for 5-10 minutes, collected in drums and fed through a belt feeder to the **pelletizer**.

DETD The premixed product is fed to a model 25C59 **pelletizer** manufactured by Strong-Scott which is equipped with a double roll and a vertical screw. The screw serves to force the premixed product between the rolls. The rolls rotate at about 15 r.p.m. and form **pellets** at a rate of 1,000 pounds of **pellets** per hour. The hydraulic pressure is set at 2,200 psig. **Pellets** formed at the **pelletizer** drop onto a 3 foot diameter screener equipped with a 1/2 inch mesh screen. The screen serves to deburr the **pellets**. Fines are recycled back to the ribbon blender or Nauta mixer. The finished **pellet** product is collected and packaged.

DETD The following Example demonstrates the good dissolution rate of **pellets** prepared according to this invention. 5 lbs. of metasilicate based warewashing **pellets** having the following composition:

DETD The following Example demonstrates the good dissolution rate of a water soluble bag of the present invention containing a **pelletized** functional composition. A water soluble bag having the following dimensions: 14 inches length, 7 1/2 inches width and a thickness of 1.5 mils and comprising a polyvinyl alcohol film bag purchased from Chris Craft Industries, Inc. having the properties set forth in Table A and containing 5 lbs. of **pellets** was inserted into a dispenser. The **pellets** had the same composition as the **pellets** disclosed in Example 3. The water soluble bag containing the **pellets** was contacted with water having a temperature of 135-155.degree. F. in order to form a solution. The solution thus formed was transferred to a 30 gallon tank containing 25 gallons of fresh water. By means of an ionic sensor it was determined that it took only 3 minutes and 7 seconds for the tank to reach the desired concentration.

DETD The following test data demonstrates the superior performance exhibited by our metasilicate based warewashing **pellets** contained in a water soluble bag when compared with powdered warewashing detergents.

DETD For the next two or three months, our article comprising a water soluble container containing **pelletized** warewashing composition was utilized in the dispensers in place of the powdered detergents.

DETD It was determined that the warewashing results obtained from use of our invention were equal to the results obtained by use of the powdered compositions, even though a lower usage of our **pelletized** products was used as compared to the powdered products.

DETD Our metasilicate based warewashing **pellets** which were tested, **Pellet A** and **Pellet B**, had the following formulas:

DETD The **Pellet A pellets** had the formula set forth in Example 3.

DETD The **Pellet B pellets** had the following formula:

DETD Five pounds of **Pellet B pellets** were contained in a water soluble bag having the properties of the water soluble bag described in Example 4.

DETD Five pounds of **Pellet A pellets** were contained in a water soluble bag as described in Example 4.

DETD The three powdered products, which we tested our article containing **Pellet A** and our article containing **Pellet B pellets** against, had the following, formulas:

DETD

Wt-%            Ingredient

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Powdered Product I

18.0       sodium tripolyphosphate  
 48.8       sodium carbonate  
 2.6       sodium polyacrylate  
 29.0       sodium metasilicate  
 1.6       sodium dichloroisocyanurate dihydrate

Powdered Product II

4.2       sodium carbonate  
 1.5       sodium polyacrylate  
 1.8       sodium dichloroisocyanurate dihydrate  
 8.8       sodium chloride  
 1.0       alkyl phosphate ester  
 22.4       sodium hydroxide  
 22.5       sodium tripolyphosphate

Powdered Competitor Product III

14.3       sodium tripolyphosphate  
 35.7       sodium carbonate  
 1.0       sodium polyacrylate  
 1.0       sodium dichloroisocyanurate dihydrate  
 22.0       sodium chloride  
 1.0       alkyl phosphate ester  
 25.0       sodium hydroxide

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Average usage  
 Test    Average usage of  
          of powdered product  
                                  Number of  
 No.    **pellet** product  
          to obtain equal results  
                                  Tests

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1.	<b>Pellet A</b> - 0.16	0.23 Product II	7
2.	<b>Pellet B</b> - 0.127	0.192 Product I	4
3.	<b>Pellet A</b> - 0.17	0.22 Product III	6
4.	<b>Pellet B</b> - 0.134	0.187 Product II	4
5.	<b>Pellet B</b> - 0.13	0.2 Product II	5
6.	<b>Pellet B</b> - 0.115	0.145 Product III	5

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DETD    As the data above demonstrates in each test a larger usage of the powder products had to be utilized in order to achieve a result equal to that obtained with a smaller usage of our articles containing **pelletized** functional composition.

DETD    The following table sets forth the formula and preparation procedure for a caustic warewashing **pellet** 4 which could be used in the water soluble bag 3 of the present invention.

DETD    The caustic warewashing **pellet** may comprise about 15-70 wt-% of an alkali metal hydroxide, preferably 25-50 wt-%, and most preferably 40 wt-% for reasons of cleaning performance. Suitable alkali metal hydroxides include but are not limited to the following: potassium hydroxide, sodium hydroxide, or mixtures of potassium and sodium hydroxide.

- DETD The caustic warewashing **pellet** may comprise about 10-50 wt-% of an inorganic sequestering agent, preferably about 25-45 wt-% for reasons of hard water control, and most preferably about 35 wt-% for reasons of economy and legal restrictions on phosphorous content. Suitable inorganic sequestering agents include but are not limited to the following: tetrasodium pyrophosphate, tetrapotassium pyrophosphate, sodium tripolyphosphate, potassium tripolyphosphate. The preferred inorganic sequestering agent is sodium tripolyphosphate, for reasons of availability and economy of use.
- DETD The caustic warewashing **pellet** may comprise about 0-8 wt-% of a bleaching source, preferably about 2-6 wt-% for reasons of economy, and most preferably about 5 wt-% for reasons of cost effectiveness. Suitable bleaching sources include but are not limited to the following: calcium hypochlorite, lithium hypochlorite, chlorinated trisodium phosphate, sodium dichloroisocyanurate dihydrate, potassium dichloroisocyanurate dihydrate, sodium dichloroisocyanurate, bleaching source comprises sodium dichloroisocyanurate dihydrate for reasons of availability and economy.
- DETD The caustic warewashing **pellet** may comprise about 0-40 wt-% of a filler, preferably 10-30 wt-%, and most preferably about 15 wt-% for reasons of cost effectiveness. Suitable fillers include but are not limited to the following: sodium carbonate, sodium silicate, sodium metasilicate, sodium borate, and sodium chloride. Sodium carbonate is the preferred filler for reasons of cost effectiveness and that it provides an additional source of alkalinity.
- DETD The caustic warewashing **pellet** may also comprise about 0-7 wt-% of an organic sequestering agent, preferably about 2-5 wt-% for reasons of economy, and most preferably about 3 wt-% for reasons of cost effectiveness.
- DETD The caustic warewashing **pellet** may comprise about 0-5 wt-% of a defoaming surfactant, preferably about 1-3 wt-% for reasons of performance, and most preferably about 2 wt-% for reasons of cost effectiveness.
- DETD To form the caustic warewashing **pellets** of the present invention all ingredients can be dry blended in an appropriate mixer such as a ribbon mixer in order to form a uniform mixture. This mixture is then **pelletized** to form **pellets** having a mass of about 5 to 15 grams using a **pelletizing** machine.
- DETD The following Example demonstrates the good dissolution rate of a water soluble bag of the present invention containing a caustic warewashing **pelletized** functional composition. A water soluble bag having the following dimensions: 12 inches length, 7 1/2 inches width and a thickness of 1.5 mils and comprising a polyvinyl alcohol film bag purchased from Chris Craft Industries, Inc. having the properties set forth in Table A containing 5 lbs. of **pellets** is inserted into a dispenser.
- DETD The caustic based warewashing **pellet** composition:
- DETD The water soluble bag containing the **pellets** is contacted with water having a temperature of 135-155.degree. F. in order to form a solution. The solution formed is transferred to a 30 gallon tank containing 25 gallons of fresh water. By means of an ionic sensor it is determined that it took less than 3 minutes for the tank to reach the desired concentration.
- DETD The **pelletized** functional composition of the present invention may also comprise a presoak composition.
- DETD Various **pelletized** presoak compositions may be used in the water soluble bag of the present invention. An example of a **pelletized** silverware presoak and detarnisher composition which could be used in the water soluble bag of the present invention is the following:

DETD

**Pelletized Presoak Composition**

	Wt-% Most Preferred	Wt-% Broad	Wt-% Preferred
Raw Material			

## 1. Sequestering agent

	24	10-34	20-30
2. Conductive filler	62.74	10-70	50-70
3. Nonionic surfactant	3.00	1-5	2-4
4. Anionic surfactant	3.00	1-5	2-4
5. Water	6.00	1-30	1-10
6. Enzyme	1.0	0.01-5.0	0.5-2.0
7. Dye	0.06	0-0.10	0.05-0.07
8. Fragrance	0.20	0-0.5	0.05-0.3

- DETD The **pelletized** presoak composition may comprise about 10-34 wt-% of a builder or a sequestering agent. Preferably the **pelletized** presoak composition contains about 20-30 wt-% of a builder or sequestering agent and most preferably about 24 wt-%. Suitable builders or sequestering agents include but are not limited to the following: sodium tripolyphosphate, EDTA (ethylene diamine tetra acetic acid), tetrasodium pyrophosphate, zeolites, citric acid, polyacrylates, NTA (nitrilotriacetic acid), and sodium carbonate. Preferably the builder or sequestering agent comprises sodium tripolyphosphate for reasons of water hardness control and cost.
- DETD The **pelletized** presoak composition may also comprise about 10-70 wt-% of a conductive filler, preferably about 50-70 wt-% for reasons of cost and dispensing control and most preferably about 62.74 wt-% for reasons of cost and dispensing control. The conductive filler serves to increase the conductivity of the water which is necessary in order to detarnish silverware. Suitable conductive fillers include but are not limited to the following: soda ash, **sodium sulfate**, sodium chloride, borax, sodium bicarbonate and sodium sesquicarbonate. Preferably the conductive filler comprises soda ash for reasons of cost, processing and dispensing control.
- DETD The **pelletized** presoak composition may also comprise about 1-5 wt-% of a nonionic surfactant, preferably about 2-4 wt-% for reasons of wetting, and most preferably about 3 wt-% of a nonionic surfactant for reasons of wetting.
- DETD The **pelletized** presoak composition may also comprise about 1 to 5 wt-% of an anionic surfactant, preferably about 2 to 4 wt-%, for reasons of wetting, and most preferably about 3 wt-% for reasons of wetting. Suitable anionic surfactants include but are not limited to the following: sulframin, alphaolefinsulfonate, **sodium lauryl sulfate**. Preferably, the anionic surfactant comprises sulframin for reasons of optimum wetting.
- DETD The **pelletized** presoak composition may also comprise about 0.01 to 5.0 wt-% of an enzyme, preferably about 0.5 to 2.0 wt-% for reasons of soil removal and most preferably about 1.0 wt-% of an enzyme for reasons of soil removal. Suitable enzymes include but are not limited to the following: esperase, amylase, lipase, and combinations thereof. Esperase serves to break down protein, whereas amylase breaks down starch and lipase breaks down fats. If three enzymes are utilized in the presoak composition, the broad range for each enzyme would range from between about 0.1 to 5.0 wt-%. Thus, the presoak can comprise up to 15 wt-% enzyme if three different enzymes are utilized.
- DETD The **pelletized** presoak composition may also comprise about 1-30 wt-% water, preferably about 1-10 wt-% for reasons of dispensing control and cost, and most preferably about 6.0 wt-% water for reasons of dispensing control and cost. Water helps aid in the **pelletization** process and also acts as a filler.
- DETD The **pelletized** presoak composition may also comprise about 0 to 0.10 wt-% of a dye, preferably about 0.05 to 0.07 wt-% for reasons of aesthetics, and most preferably about 0.06 wt-% for reasons of aesthetics. Suitable dyes include any dye stable at pH's of above 10.
- DETD The **pelletized** presoak composition may also comprise about 0 to 0.5 wt-% of a fragrance, preferably about 0.05 to 3 wt-%, for reasons of aesthetics, and most preferably about 0.20 wt-% for reasons of aesthetics. Suitable fragrances include any that are compatible in the

overall system.

- DETD The **pelletized** presoak composition can be formed by either batch or continuous processing. The **pelletized** presoak composition can be manufactured according to the following procedure.
- DETD Presoak **Pellet** Preparation
- DETD The **pelletized** presoak composition can be formed by either batch or continuous processing. The following is an example of a batch production process. 25 wt-% of a dry, powdered or **granular** sequestering agent or builder (sodium tripolyphosphate) is charged to a 100 lb. mix tank and agitation is begun. A dye is then dissolved in 4 wt-% water and sprayed onto the sodium tripolyphosphate while agitation continues until a uniform color is achieved.
- DETD The premixed product is fed to a Model 25CS9 **pelletizer** manufactured by Strong-Scott which is equipped with a double roll and a vertical screw. The screw serves to force the premixed product between the rolls. The rolls rotate at about 15 r.p.m. and form **pellets** at a rate of about 1,000 lbs. of **pellets** per hour. The hydraulic pressure is set at 2,200 psig. **Pellets** formed at the **pelletizer** drop onto a 3' diameter screener equipped with a 1/2" mesh screen. The screen serves to deburr the **pellets**. Fines are recycled back to the mixer. The finished **pellet** product is collected and packaged.
- DETD The following Example demonstrates the good dissolution rate of a water soluble bag of the present invention containing a **pelletized** presoak functional composition. A water soluble bag having the following dimensions: 14 inches length, 7 1/2 inches width and a thickness of 1.5 mils and comprising a polyvinyl alcohol film bag purchased from Chris Craft Industries, Inc. having the properties set forth in Table A containing 5 lbs. of **pellets** is inserted into a dispenser.
- DETD The water soluble bag containing the **pellets** is contacted with water having a temperature of 135-155.degree. F. in order to form a solution. The solution formed is transferred to a 30 gallon tank containing 25 gallons of fresh water. By means of an ionic sensor it is determined that it took less than 3 minutes for the tank to reach the desired concentration.
- DETD 4. General Purpose Floor and Wall Cleaner and Manual Dishwashing **Pellet**
- DETD The following general purpose floor and wall cleaner and manual dishwashing **pellet** can be used in the water soluble bag of the present invention.
- DETD The general purpose **pellet** can comprise about 0-85 wt-% of a filler. Suitable fillers include but are not limited to the following: **sodium sulfate**, sodium chloride, and other neutral soluble salts. Preferably the filler is **sodium sulfate** for reasons of minimizing corrosion to soft metals.
- DETD The general purpose **pellet** can comprise about 5-70 wt-% of an anionic surfactant, preferably about 5-35 wt-% for reasons of cost and performance. Suitable anionic surfactants include but are not limited to the following: linear dodecyl benzene sulfonate, alcohol ethoxy sulfates, alkano sulfonates, alkali and alkaline earth salts. A high concentration of anionic surfactant results in a **pellet** which can be **pelletized** easier and also a **pellet** which performs better when dissolved in water. However, a low concentration of anionic surfactant results in a **pellet** that is more inexpensive.
- DETD The general purpose **pellet** comprises can comprise about 0-30 wt-% of a nonionic surfactant. Preferably the nonionic surfactant is included in an amount such that about 1 part nonionic surfactant is included for about every 2 parts of anionic surfactant. Suitable nonionic surfactants include but are not limited to the following: fatty acid amides, ethylene oxide, and/or propylene oxide adducts of alcohols.
- DETD The general purpose **pellet** may also comprise about 0 to 5 wt-% of a corrosion inhibitor such as a low alkaline silicate such as sodium silicate or potassium silicate, preferably sodium silicate. Preferably the ratio of M.sub.2 O:SiO.sub.2 is less than about 1:1.
- DETD The general purpose **pellets** are formed by conventional

high-pressure **pellet** production methods. Such methods involve combining **granular**-or powdered **anhydrous** materials, mixing them to form a premixed product and then transferring the premixed product to a **pelletizer**.

DETD The following Example demonstrates the good dissolution rate of a water soluble bag of the present invention containing a **pelletized** general purpose functional composition. A water soluble bag having the following dimensions: 12 inches length, 7 1/2 inches width and a thickness of 1.5 mils and comprising a polyvinyl alcohol film bag purchased from Chris Craft Industries, Inc. having the properties set forth in Table A containing 4 lbs. of **pellets** was inserted into a dispenser.

DETD The **pellets** had the following composition:

Ingredients	Wt-%
1. <b>Sodium sulfate</b>	82.4
2. Linear dodecyl benzene sulfonate	14.7
3. Low alkaline sodium silicate	1.0
4. Dye	.0075
5. Diatomaceous Earth - (flow agent)	1.0
6. Emollient	.3925
7. Sodium polyacrylate	.5

DETD The water soluble bag containing the **pellets** was contacted with water having a temperature of 135-155.degree. F. in order to form a solution. The solution thus formed was transferred to a 30 gallon tank containing 25 gallons of fresh water. By means of an ionic sensor it was determined that it took less than 3 minutes and 10 seconds for the tank to reach the desired concentration.

DETD 5. Hard Surface Cleaner **Pellet**

DETD The following **pelletized** hard surface cleaner can be used in the water soluble bag of the present invention.

DETD The **pelletized** hard surface can comprise about 12.0-18.0 wt-% of a buffering agent, preferably about 15.0 suitable buffering agent's include but are not limited to the following: sodium bicarbonate, mixtures of sodium bicarbonate and sodium carbonate, disodium phosphate, trisodium phosphate, monosodium phosphate, mixtures of disodium phosphate and trisodium phosphate, borates such as sodium tetra borate and borax, and combinations of carbonates and phosphates. Suitable combinations of carbonates and phosphates have a weight ratio about 1:1 resulting in a pH of about 9-10.

DETD The **pelletized** hard surface cleaner can comprise about 8.0-12.0 wt-% of an alkalinity and ammonium source, preferably about 10.0 wt-%. Suitable sources include but are not limited to the following: ammonium bicarbonate, ammonium phosphate, diammonium phosphate, a mixture of ammonium chloride and sodium carbonate and other sources capable of forming ammonium ions in solution.

DETD The composition can also comprise about 12.0-18.0 wt-% of an inorganic sequestering agent preferably about 15.0 wt-%. Suitable sequestering agents include but are not limited to those set forth as being suitable for use in the laundry detergent **pellet**.

DETD Preferably the sequestering agent comprises a low density sodium tripolyphosphate bead. A bead is preferred over a powder in that it can be crushed which results in a stronger nonfriable **pellet**.

DETD The **pelletized** hard surface cleaner can also comprise about 22.0-28.0 wt-% of an anionic surfactant, preferably about 25 wt-%. Suitable anionic surfactants include but are not limited to the following: sodium dodecyl benzene sulfonate, **sodium lauryl sulfate** and other anionic surfactants which result in a **pellet** that is non pasty.

DETD The **pelletized** hard surface cleaner can also comprise about

22.0-28.0 wt-% of a nonionic surfactant preferably about 15.0 wt-%. Such nonionic surfactants should be high foaming. Suitable nonionic surfactants include but are not limited to the following: fatty alcohol ethoxylates which are the reaction products of alkyl phenols such as nonyl phenol and octyl phenol with ethylene oxide.

DETD The **pelletized** hard surface cleaner can also comprise about 8.0-12.0 wt-% of an organic sequestering agent, preferably about 10.0 wt-%.

DETD The following Example demonstrates the good dissolution rate of a water soluble bag of the present invention containing a **pelletized** hard surface cleaner functional composition. A water soluble bag having the following dimensions: 14 inches length, 7 1/2 inches width and a thickness of 1.5 mils and comprising a polyvinyl alcohol film bag purchased from Chris Craft Industries, Inc. having the properties set forth in Table A containing 5 lbs. of **pellets** 13 are inserted into a dispenser.

DETD The water soluble bag containing the **pellets** is contacted with water having a temperatures of 135-155.degree. F. in order to form a solution. The solution formed is transferred to a 30 gallon tank containing 25 gallons of fresh water. By means of an ionic sensor it is determined that it takes less than 3 minutes for the tank to reach the desired concentration.

CLM What is claimed is:

1. An article of manufacture that can be dispensed to a use location from a dispenser by the action of an aqueous liquid, wherein said article comprises: (a) a sealed water soluble container; and (b) an institutional multiple use amount of greater than 200 grams of a **pelletized** water soluble or dispersible functional composition contained within said water soluble container, wherein each **pellet** has a mass of about 2 to 30 grams, said water soluble container fits within said dispenser, and said **pelletized** functional composition comprises: (i) about 5-90 wt-% of an alkali metal silicate; and (ii) about 1-90 wt-% of a sequestering agent.

2. The article of claim 1 wherein the **pelletized** functional composition further comprises about 0 to 0.1 wt-% of a dye.

3. The article of claim 1 wherein the **pelletized** functional composition further comprises about 0 to 50 wt-% of a nonionic surfactant.

4. The article of claim 1 wherein the **pelletized** functional composition further comprises about 0 to 20 wt-% of an anionic surfactant.

5. The article of claim 1 wherein the **pelletized** functional composition which further comprises about 0-1.0 wt-% of a fragrance.

6. The article of claim 1 wherein the **pelletized** functional composition further comprises about 0 to 80 wt-% of sodium carbonate.

9. The article of claim 1 wherein the water soluble container comprises a water soluble polymer selected from the group consisting of a polyvinyl alcohol, **polyvinyl acetate** or mixtures thereof.

10. The article of claim 1 wherein the water soluble container contains at least about 900 grams of a **pelletized** functional material.

11. The article of claim 1 wherein the water soluble container will dissolve when exposed to a water spray having a minimum water temperature of about 40.degree. F. and a minimum nozzle pressure of about 25 to 30 psig such that the **pelletized** functional material is exposed in about 0.5-3 minutes.

12. The article of claim 1 wherein the water soluble container contains

about 900 grams to 5000 grams of a **pelletized** functional material.

13. The article of claim 1 wherein each **pellet** has a width ranging from about 5 to 30 mm., a height ranging from about 10 to 80 mm., and a depth ranging from about 10 to 30 mm.

14. An article of manufacture that can be dispensed to a use location from a dispenser by the action of an aqueous liquid, wherein said article comprises: (a) a sealed water soluble container; and (b) an institutional multiple use amount of greater than 200 grams of a **pelletized** water soluble or dispersible functional composition contained within said water soluble container; wherein each **pellet** has a mass of about 2 to 30 grams, said water soluble container fits within said dispenser, and said **pelletized** functional composition comprises: (i) about 10-70 wt-% of a sequestering agent; (ii) about 10-70 wt-% of an alkali metal silicate; and (iii) about 0.1-10 wt-% of a bleaching source.

15. The article of claim 14 wherein the **pelletized** functional composition further comprises about 0 to 10 wt-% of a secondary sequestering agent.

16. The article of claim 14 wherein the **pelletized** functional composition further comprises about 0 to 60 wt-% of a filler.

17. The article of claim 14 wherein the **pelletized** functional composition further comprises about 0 to 10 wt-% of defoaming surfactant.

18. The article of claim 14 wherein the **pelletized** functional composition further comprises about 0 to 10 wt-% of a dye.

19. The article of claim 14 wherein the **pelletized** functional composition further comprises about 0 to 10 wt-% of a fragrance.

22. The article of claim 14 wherein the water soluble container comprises a water soluble polymer selected from the group consisting of a polyvinyl alcohol, **polyvinyl acetate** or mixtures thereof.

23. The article of claim 14 wherein the water soluble container contains about 900 grams to 5000 grams of a **pelletized** functional material.

24. The article of claim 14 wherein each **pellet** has a width ranging from about 5 to 30 mm., a height ranging from about 10 to 80 mm, and a depth ranging from about 10 to 30 mm.

25. The article of claim 14 wherein the water soluble container will dissolve when exposed to a water spray having a minimum water temperature of about 40.degree. F. and a minimum nozzle pressure of about 25 to 30 psig such that the **pelletized** functional material is exposed in about 0.5-3 minutes.

26. The article of claim 14 wherein the **pelletized** functional composition comprises: (a) about 30 to 70 wt-% of a sequestering agent; (b) about 30 to 70 wt-% of an alkali metal silicate; and (c) about 0.1 to 10 wt-% of a bleaching source.

27. The article of claim 1 wherein the **pelletized** functional material comprises: (a) about 30 to 90 wt-% of an alkali metal silicate; and (b) about 10 to 90 wt-% of a sequestering agent.

28. An article of manufacture that can be dispensed to a use location from a dispenser by the action of an aqueous liquid, wherein said

article comprises: (a) a sealed water soluble container; and (b) an institutional multiple use amount of greater than 200 grams of a **pelletized** water soluble or dispersible functional composition contained within said water soluble container, wherein the **pelletized** functional composition is of a size of that will not pass through a grate having openings of 5 mm by 5 mm, said water soluble container fits within said dispenser, and said **pelletized** functional composition comprises: (i) about 5-90 wt-% of an alkali metal silicate; and (ii) about 1-90 wt-% of a sequestering agent.

29. The article of claim 28 wherein the **pelletized** functional composition further comprises about 0 to 50 wt-% of a nonionic surfactant.

30. The article of claim 28 wherein the **pelletized** functional composition further comprises about 0 to 20 wt-% of an anionic surfactant.

31. The article of claim 28 wherein the **pelletized** functional composition further comprises about 0 to 80 wt-% of sodium carbonate.

34. The article of claim 28 wherein the water soluble container comprises a water soluble polymer selected from the group consisting of a polyvinyl alcohol, **polyvinyl acetate** or mixtures thereof.

35. The article of claim 28 wherein the water soluble container will dissolve when exposed to a water spray having a minimum water temperature of about 40.degree. F. and a minimum nozzle pressure of about 25 to 30 psig such that the **pelletized** functional material is exposed in about 0.5-3 minutes.

36. The article of claim 28 wherein each **pellet** has a width ranging from about 5 to 30 mm, a height ranging from about 10 to 80 mm, and a depth ranging from about 10 to 30 mm.

37. An article of manufacture that can be dispensed to a use location from a dispenser by the action of an aqueous liquid, wherein said article comprises: (a) a sealed water soluble container; and (b) an institutional multiple use amount of greater than 200 grams of a **pelletized** water soluble or dispersible functional composition contained within said water soluble container; wherein the **pelletized** functional composition is of a size that will not pass through a grate having openings of 5 mm by 5 mm, said water soluble container fits within said dispenser, and said **pelletized** functional composition comprises: (i) about 10-70 wt-% of a sequestering agent; (ii) about 10-70 wt-% of an alkali metal silicate; and (iii) about 0.1-10 wt-% of a bleaching source.

38. The article of claim 37 wherein the **pelletized** functional composition further comprises about 0 to 10 wt-% of a secondary sequestering agent.

39. The article of claim 37 wherein the **pelletized** functional composition further comprises about 0 to 60 wt-% of a filler.

40. The article of claim 37 wherein the **pelletized** functional composition further comprises about 0 to 10 wt-% of defoaming surfactant.

43. The article of claim 37 wherein the water soluble container comprises a water soluble polymer selected from the group consisting of a polyvinyl alcohol, **polyvinyl acetate** or mixtures thereof.

44. The article of claim 37 wherein each **pellet** has a width

ranging from about 5 to 30 mm, a height ranging from about 10 to 80 mm, and a depth ranging from about 10 to 30 mm.

45. The article of claim 37 wherein the water soluble container will dissolve when exposed to a water spray having a minimum water temperature of about 40.degree. F. and a minimum nozzle pressure of about 25 to 30 psig such that the **pelletized** functional material is exposed in about 0.5-3 minutes.

IT 9002-89-5, Poly(vinyl alcohol) **9003-20-7**, Poly(vinyl acetate)  
9003-39-8, Poly(vinylpyrrolidone)  
(containers, water-sol., for dispensing of detergent compns.)

IT **9003-20-7**, Poly(vinyl acetate)  
(containers, water-sol., for dispensing of detergent compns.)

RN 9003-20-7 USPATFULL

CN Acetic acid ethenyl ester, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 108-05-4

CMF C4 H6 O2

AcO-CH=CH<sub>2</sub>

L71 ANSWER 3 OF 8 USPATFULL

AN 93:24675 USPATFULL

TI **Article** comprising a water soluble bag containing a multiple use amount of a **pelletized** functional material and methods of its use

IN Gladfelter, Elizabeth J., Falcon Heights, MN, United States

Slocumb, Sheryl D., New Brighton, MN, United States

PA Ecolab Inc., St. Paul, MN, United States (U.S. corporation)

PI US 5198198 19930330

AI US 1989-439796 19891121 (7)

RLI Division of Ser. No. US 1989-368085, filed on 16 Jun 1989, now abandoned which is a continuation of Ser. No. US 1987-104458, filed on 2 Oct 1987, now abandoned

DT Utility

EXNAM Primary Examiner: Willis, Jr., Prince; Assistant Examiner: McNally, John F.

LREP Merchant, Gould, Smith, Edell, Welter & Schmidt

CLMN Number of Claims: 21

ECL Exemplary Claim: 1

DRWN 3 Drawing Figure(s); 1 Drawing Page(s)

LN.CNT 1671

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB An article comprising a water soluble container containing a multiple use amount of a **pelletized** functional composition such as a fabric treatment composition, a warewashing composition, a laundry composition, a pot and pan presoak composition, a silverware presoak composition, a floor cleaner composition, a rinse additive composition, a disinfectant composition, a sanitizer composition, a general purpose cleaner composition, etc. The article may be optionally enclosed in a water impervious outerwrap. A method for using the article by placing the article inside a dispenser wherein the article is contracted with water having a sufficient temperature and pressure to dissolve the water soluble bag and the **pelletized** functional material contained therein in order to form a solution.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

TI **Article** comprising a water soluble bag containing a multiple use amount of a **pelletized** functional material and methods of its use

- AB An article comprising a water soluble container containing a multiple use amount of a **pelletized** functional composition such as a fabric treatment composition, a warewashing composition, a laundry composition, a pot and pan presoak composition, a silverware presoak composition, a floor cleaner composition, a rinse additive composition, a disinfectant composition, a sanitizer composition, a general purpose cleaner composition, etc. The article may be optionally enclosed in a water impervious outerwrap. A method for using the article by placing the article inside a dispenser wherein the article is contracted with water having a sufficient temperature and pressure to dissolve the water soluble bag and the **pelletized** functional material contained therein in order to form a solution.
- SUMM The invention relates to an article comprising a water soluble bag containing a multiple use amount of a **pelletized** water soluble or dispersible functional material. A fabric treatment composition, warewashing composition, a laundry composition, a pot and pan presoak composition, a silverware presoak composition, a floor cleaner composition, a rinse additive composition, a disinfectant composition, a sanitizer composition, a general purpose cleaner composition, etc. all can be packaged and dispersed from the water soluble bag.
- SUMM More particularly, the invention relates to an article comprising a water soluble bag containing a multiple use amount of a **pelletized** functional composition which can be used in a dispenser wherein the water soluble bag is dissolved upon contact with a spray or stream of water from the dispenser exposing the **pellets** to the water. Upon contact with water, the **pellets** in the dispenser dissolve over a period of time, forming a use solution.
- SUMM Single use domestic detergent .packets comprising powdered or **pelletized** detergent within a water soluble single use packet are known in the art. See Dunlop, U.S. Pat. No. 3,198,740. Such packets are intended for direct insertion into the wash water contained in a washing machine and are not intended for use in a dispenser. Each packet equals one use or application. In addition, such packets are intended for domestic rather than institutional use.
- SUMM I have found that the drawbacks of powder use generally can be solved by an article of manufacture comprising a sealed water soluble container enclosing as little as about 200 grams, 450 grams, of a **pelletized** functional composition.
- SUMM I have found the drawbacks of powdered warewashing detergent use can be solved by an article of manufacture comprising a sealed water soluble container enclosing typically at least about 900 grams of a **pelletized** warewashing functional composition.
- SUMM The amount of **pelletized** composition contained in the article can vary according to a number of factors including but not limited to the following: the dispenser size, the intended use of the solution formed, the **pellet** composition, etc.
- DRWD FIG. 1 is a front perspective view with portions thereof broken away for ease of installation of a dispenser in which is situated an article comprising a water soluble bag containing **pelletized** functional material.
- DRWD FIG. 2 is a front elevational view with portions thereof broken away of the article comprising a water soluble bag containing a functional **pelletized** material shown in FIG. 1 which further comprises a moisture impervious outerwrap.
- DRWD FIG. 3 is a front elevational view taken in section generally through the center of the dispenser in which is situated an article which is resting upon **pelletized** functional material which was previously enclosed in a water soluble container which has dissolved.
- DETD Referring to the drawings, wherein, like numerals represent like parts throughout the several views; there is generally designated an article

16 comprising a sealed water soluble bag 3 containing a **pelletized** functional composition 4 situated in a dispenser 5. (See FIG. 1.)

DETD There is also generally designated an article 16 comprising a sealed water soluble bag 3 containing a **pelletized** functional composition 4 further contained within a removable water impervious outerwrap 2. (See FIG. 2.)

DETD Polyvinyl alcohol, **polyvinyl acetate**, methyl cellulose, hydroxyethyl cellulose, carboxymethyl cellulose, sodium carboxymethylhydroxyethyl cellulose, polyvinyl pyrrolidone, poly(alkyl)oxazoline, and film-forming derivatives of polyethylene glycol.

DETD Polyvinyl alcohol which is preferred is an excellent film forming material, and has good strength and pliability under most conditions. Commercially available polyvinyl alcohol compositions for casting as films vary in molecular weight and degree of hydrolysis. For most film applications, molecular weights in the range of about 10,000 to about 100,000 are preferred. Hydrolysis is the percent by which acetate groups of the polyvinyl alcohol have been substituted with hydroxyl groups. For film applications, the range of hydrolysis typically is about 70% up to 100%. Thus, the term "polyvinyl alcohol" usually includes **polyvinyl acetate** compounds.

DETD It is also important to select a water soluble film that does not react with the **pellets** 4 contained in the water soluble bag 3 formed therefrom. Other factors which should be considered when choosing a water soluble film to form the water soluble bag 3 include the following: the effect of the water soluble film on equipment including pumps, pipes and nozzles; the effect of the water soluble film on waste water; the toxicity of the water soluble film; the printability of the water soluble film; and properties which allow the water soluble film to be used on automated bag-making equipment (i.e. sealability, tensile strength and tear strength).

DETD The water soluble bag 3 is filled by pouring the weighed **pelletized** functional material 4 into the previously prepared water soluble bag 3 and finally heat sealing the fourth edge.

DETD Thus the article 16 comprising the sealed water soluble bag 3 containing the **pelletized** functional composition 4 should be protected from atmospheric humidity. The article 16 can be placed in the moisture impervious outerwrap 2 described further below.

DETD The water soluble bag 3 can be of whatever dimensions necessary in order to enclose the desired amount of **pelletized** functional composition.

DETD However, as currently envisioned with about 200 to 450 pounds as the expected minimum amount of **pelletized** composition that will be enclosed, the expected internal bag dimensions would typically be about 4 to 5 inches wide and about 5 to 7 inches long.

DETD The water soluble bag 3 should have a minimum capacity of about 200 grams to 900 grams for reasons of customer convenience depending upon the nature of the **pellet** 4.

DETD The amount of **pelletized** composition 4 that the water soluble container 3 would contain is dependent to an extent upon the **pelletized** composition and its intended use.

DETD A water soluble container 3 intended for containing a **pelletized** silicate laundry detergent or a **pelletized** laundry softening agent should have a typical capacity of about 450 grams.

DETD A water soluble container 3 intended for containing a **pelletized** silicate warewashing composition or a **pelletized** caustic warewashing composition should have a typical capacity of about 900 grams.

DETD A water soluble container 3 intended for containing a **pelletized** presoak composition, a **pelletized** general purpose composition or a **pelletized** hard surface cleaner should have a typical capacity of about 200 grams.

DETD Whenever a warewashing **pelletized** functional composition 4 is enclosed by the water soluble container 3, the water soluble container typically encloses at least about 900 grams of the **pelletized**

functional composition 4.

DETD The water soluble bag 3 should have a maximum capacity of about 3 kg-9 kg for reasons of customer convenience. Preferably, the water soluble bag 3 should have a capacity of about 1 kg-5 kg most preferably about 2-3 kg, depending upon the **pelletized** composition and its intended use.

DETD The water soluble bag containing **pelletized** warewashing composition should have a capacity of about 900 grams-9 kg for reasons of customer convenience.

DETD A typical water soluble bag 3 containing approximately four pounds of **pelletized** functional material 4 may have overall dimensions of about 8 inches by about 12 inches, with sealed margins of about 1/4 to 1/2 inches.

DETD A typical water soluble bag 3 containing approximately six pounds of **pelletized** functional material 4 may have inside dimensions of about 7 1/2 inches by about 14 inches, with sealed margins of about 1/4-1/2 inches.

DETD **Pelletized** Functional Material

DETD The water soluble bag 3 contains enough **pellets** 4 in order to provide for multiple uses when the water soluble bag 3 is placed in a dispenser 5 and contacted with water.

DETD The water soluble bag 3 contains a sufficient amount of **pellets** 4 to provide for at least about 2 uses, preferably about 4 to 20 uses for reasons of customer convenience and most preferably about 8 to 12 uses for reasons of customer convenience. Besides being dependent upon the amount of **pelletized** material, the number of uses is also dependent upon the water temperature, water pressure, **pellet** composition, water flow rate, water soluble bag composition and length of time the **pellets** are contacted with water during each use.

DETD The mass of each **pellet** 4 typically ranges from about 2 to 30 grams, preferably about 5 to 15 grams for reasons of dissolution, and most preferably about 7 to 8 grams for reasons of preferred dissolution rate. If the 4 **pellets** are too large the rate of dissolution will be too low. If the rate of dissolution is too low the solution formed will have too low of a concentration of dissolved functional material. If the **pellets** 4 are too small the rate of dissolution will be too high. If the rate of dissolution is too high the solution formed will have too high of a concentration of dissolved functional material. Typically, the detergent solution is transferred to a washing or cleaning apparatus which has a concentration monitoring device which controls the length of time water is sprayed through the nozzle 11 onto the **pelletized** material 4. If the solution enters at the machine in a highly concentrated form, the concentration could reach too high of a level before the sensor would detect the concentration and shut off the flow of water to the dispenser 5. In addition, concentrations that are too high could affect product performance.

DETD A **pellet** 4 can have the following dimensions: a width ranging from about 5 to 30 mm, a height ranging from about 10 to 80 mm, and a depth ranging from about 10 to 30 mm. Preferably each **pellet** has about a width of about 19 mm, a height of about 30 mm and a width of about 15 mm for preferred dissolution.

DETD As used herein, the terms "**pellet**" 4, "**pelletized** functional material" 4, and "**pelletized** functional composition" are used interchangeably. The terms also include but are not limited to the following: briquettes, tablets, **pellets**, nuggets, etc.

DETD The shape of the **pellets** 4 used in the water soluble bag 3 of the present invention can vary. The shape of a **pellet** 4 can include any regular geometric shape including but not limited to the following: spherical, pyramidal, cubic, oblate spheroid, prismatic, cylindrical, etc.

DETD Preferably, the **pellets** 4 used in the water soluble bag 3 of the present invention are spheroid shaped for reasons of manufacturing ease.

DETD In order to protect the article 16 of the present invention which

comprises a water soluble bag 3 containing a multiple use amount of a **pelletized** functional material 4 during storage, shipping and handling, a water impervious outerwrap 2 can be provided to prevent damage from atmospheric moisture such as high humidity, rain and dew and from accidental contact with water by splashing or wet hands. This water impervious outerwrap 2 can be provided for either an individual article 16 or groups of articles 16, whichever appears to be most desirable for the individual case. Preferably, the water impervious outerwrap 2 is provided individually for each article 16 for reasons of customer safety and convenience and product protection. Once the water impervious outerwrap 2 is removed, the article 16 should either be protected from water contact or promptly inserted into the dispenser 5.

- DETD A polyethylene water impervious outerwrap 2 having the following dimensions can be used to enclose a water soluble bag 3 containing 4 lbs. of **pelletized** functional composition 4.
- DETD The enclosed **pelletized** functional material 4 is typically used by placing the article 16 inside the dispenser 5 after removing the water impervious outerwrap 2. The water soluble bag 3 of the present invention contains too large of an amount of **pelletized** functional material 4 to be placed directly in a warewashing or cleaning apparatus for a single use cycle.
- DETD The perforated grate 6 serves to support the water soluble bag 3 containing the **pellets** 4 within the dispenser 5.
- DETD The perforated grate 6 is preferably flat in order to facilitate contact of the water soluble bag 3 and **pellets** 4 with the water being sprayed from below.
- DETD The perforated grate 6 contains a number of openings 7. The openings 7 must be of a sufficient size and number to allow an adequate amount of water to spray through the perforated grate 6 in order to dissolve the water soluble bag 3 and the **pellets** 4 contained therein. To facilitate dispensing it is preferable that the perforated grate 6 contain as many openings 7 as possible in order to facilitate contact of water from the nozzle 11 below with the **pellets** 4 and the water soluble bag 3 which are supported by the perforated grate 6. The openings 1 should not be so numerous that the perforated grate 6 is too weak to support the weight of the water soluble bag 3 and **pellets** 4 or to permit the **pellets** to pass through the grate openings.
- DETD The openings 7 should be smaller than the **pellets** 4 contained in water soluble bag 3 so that the **pellets** 4 do not fall through the openings 7 in perforated grate 6 as soon as the water soluble bag 3 dissolves.
- DETD A safety grate 9 is typically situated below the perforated grate 6. The safety grate 9 serves to collect any subdivided **pellet** 4 particles which have been eroded to a size small enough to fall through an opening 7 contained in perforated grate 6. The safety grate 9 typically has a size such that a particle comprising about 5 mm.times.5 mm or larger cannot fit through the openings 10 contained in safety grate 9.
- DETD The safety grate 9 can comprise a number of materials including but not limited to the following: plastic, metal, and **wire** mesh.
- DETD The safety grate 9 prevents **pellet** 4 particles from entering and clogging the line 13 leading from the dispenser 5 to the unit such as a warewashing machine that uses the use solution. Water which has been sprayed through nozzle 11, through perforated grate 6 and onto the water soluble bag 3 and **pellets** 4 supported by perforated grate 6 dissolves the **pellets** 4 resulting in the formation of a use solution. The use solution thus formed flows back down through the perforated grate 6 and safety grate 9 and out of the dispenser 5 through line 13. **Pellet** 4 particles which have fallen onto safety grate 9 are dissolved upon- contact with the use solution as it flows out of the dispenser 5.
- DETD A nozzle 11 or other fluid dispersing means is typically positioned such that water or other dissolving fluid can be directed onto the water soluble bag 3 and **pellets** 4 resting on the perforated grate 6 in order to form a solution.

DETD The rate of dissolution of the water soluble bag 3 and the **pellets** 4 contained therein is dependant upon a number of factors including the water temperature and the pressure of the water sprayed upon the water soluble bag 3 and the **pellets** 4 contained therein. The higher the water pressure the higher the dissolution rate of the water soluble bag 3 and **pellets** 4. Likewise, the higher the water temperature the higher dissolution rate of the water soluble bag 3 and **pellets** 4. The size of the **pellet** 4 itself also affects the dissolution rate.

DETD The smaller the **pellet** 4 the higher its dissolution rate. Conversely, the larger the **pellet** 4 the lower its dissolution rate.

DETD A **pellet**'s 4 dissolution rate is also affected by whether the **pellet** 4 has been previously wetted. If a **pellet** 4 has been wetted during a pervious solution formation cycle then it will have a higher dissolution rate during subsequent solution formation cycles.

DETD The dissolution rate of a **pellet** 4 is also affected by the **pellet**'s 4 density. The higher the density of a **pellet** 4, the slower it dissolves.

DETD The **pellets** 4 used in the water soluble bag 3 of the present invention can have a density ranging from about 1.0 to 3.0 gm/ml, preferably about 1.7 to 2.0 gm/ml for reasons of dispensing and most preferably 1.8 to 1.9 gm/ml for reasons of friability and dispensing.

DETD A warewashing **pellet** 4 for use in the article 16 of the present invention has a dissolution rate such that it does not completely dissolve in less than about 7-10 minutes when contacted with water having a temperature of the range of water typically used in consumer dishwashers.

DETD The rate of dissolution is also dependent upon the composition of the water soluble bag 3 itself and upon the compositions of the **pellets** 4 contained therein.

DETD Preferably, the **pelletized** functional material is contacted with a water spray having a sufficient temperature and pressure in order to form a concentrate which can be dispensed to its use location within about 0.5-5 minutes. Preferably, the dispensing time necessary in order to achieve the desired concentration of functional material at the use location is less than 3 minutes.

DETD The temperature of the water sprayed through the nozzle 11 onto the article 16 can vary depending upon the composition of the water soluble container 3 and the **pelletized** functional material 4.

DETD Preferably, the water has a minimum temperature of about 34.degree. F. in order to dissolve the water soluble container. The minimum water temperature is also dependent upon the composition of the **pelletized** functional material.

DETD The contact of water with the **pelletized** functional material 4 within the dispenser 5 results in the formation of a solution. Such solution is directed be means of a line 13 into a washtank, bucket or wherever the solution is needed.

DETD An ionic sensor or other concentration monitoring device can be used to determine the concentration of solution formed by action of the water on the **pellets** 4 contained within the dispenser 5. The ionic sensor serves to regulate the length of time water is sprayed through the nozzle 11, thus insuring a high accuracy with regards to the functional material solution concentration.

DETD The dispenser 5 used to dissolve the article 16 of the present invention can be used by itself in order to form a solution from the **pellets** 4 contained in the water soluble bag 3. Alternatively, the dispenser 5 can be mounted directed onto a machine such as a warewashing machine, laundry machine, etc. which the dispenser 5 is being used in conjunction with. Alternatively, the dispenser 5 can be situated on the floor next to the machine it is being used in conjunction with, or mounted on a nearby wall.

DETD **Pelletized Functional Composition**

DETD The article 16 of the present invention can contain a multiple use amount of a **pelletized** functional material 4 including but not limited to a fabric treatment composition, a warewashing composition, a

laundry composition, a pot and pan cleaner or presoak composition, a silverware cleaner or presoak composition, a floor cleaner composition, a rinse additive composition, a disinfectant composition, a general purpose cleaner composition, etc. The **pelletized** materials of the invention are room temperature solids. The materials are solidified by a variety of mechanisms, including compressive molding, compressive **pelletizing**, casting, hydration hardening, the user of organic hardening agents, etc.

DETD Formula I comprises a detergent **pellet** whereas Formula II comprises a fabric softening **pellet** which also serves to lower the pH (i.e. acidify or sour) the water in which the **pellet** is dissolved.

DETD

Narrow	Preferred	
		Broad

#### FORMULA I

##### SILICATE LAUNDRY DETERGENT **PELLET**

1.	Alkali metal silicate	48-52	30-60	5-90
2.	Alkali metal hydroxide	20-50	20-60	0-80
3.	Sequestering agent	15-30	10-60	1-90
4.	Antiredeposition agent	2-4	2-8	0-10
5.	Dye	0.018-0.022	0.005-0.05	0-0.5
Optional Ingredients				
6.	Optical brightener	0.1-1.0	0-5	
7.	Nonionic surfactant	20-30	0-50	
8.	Anionic surfactant	5-15	0-20	
9.	Fragrance	0.05-0.5	0-1.0	
10.	Sodium carbonate		0-80	
11.	Water of hydration		0-30	

#### FORMULA II

##### LAUNDRY SOFTENING **PELLET**

1.	Moderate pH acid	70-90	50-100
2.	Quaternary surfactant	20-40	10-50 50-100
3.	Optical brightener	0.1-0.4	0-2
4.	Fragrance	0.1-0.5	0-2
5.	Iron control agents	5-15	0-20
6.	Water of hydration		0-43
7.	Enzyme		0- 5

DETD 1(a). LAUNDRY COMPOSITION--FORMULA I--LAUNDRY DETERGENT **PELLET**

DETD Alkali Metal Silicate: The laundry detergent **pellet** may comprise about 0 to 100 wt-% of an alkali metal silicate, preferably about 30 to 60 wt-% for reasons of detergency and dispensing ability and most preferably about 48-52 wt-% for reasons of solubility.

DETD Alkali Metal Hydroxide: The laundry detergent **pellet** may comprise about 0 to 80 wt-% of a source of an alkali metal hydroxide, preferably about 20 to 60 wt-% for reasons of solubility and detergency and most preferably about 20 to 50 wt-% for reasons of effective cleaning. Suitable alkali metal hydroxides include: potassium hydroxide and sodium hydroxide.

DETD Sequestering Agents: The laundry detergent **pellet** may comprise about 0 to 100 wt-% of a sequestering agent, preferably about 10 to 60 wt-% for reasons of chelating water hardness and improving soil removal

and most preferably about 15 to 30 wt-% for reasons of effective sequestering. Suitable sequestering agents include but are not limited to the following: alkali metal phosphates such as pyrophosphates, tripolyphosphates, sodium aluminosilicates, sodium carbonate, and also organic sequestering agents, such as EDTA, NTA, phosphonates, polyacrylic acid, copolymers of acrylic acid, copolymers of itaconic acid, etc. Preferably the sequestering agent comprises sodium tripolyphosphate for reasons of cost.

- DETD Dye: The laundry detergent **pellet** may also comprise about 0-0.5 wt-% of a dye, preferably about 0.005-0.05 wt-%, and most preferably about 0.018-0.022 wt-%.
- DETD Antiredeposition Agent: The laundry detergent **pellet** may also comprise about 0-10 wt-% of an antiredeposition agent, preferably 2-8 wt-% for reasons of suspending soil and preventing deposition on fabric and most preferably about 2-4 wt-% of an antiredeposition agent for reasons of effective soil suspension. Suitable antiredeposition agents include but are not limited to the following: substituted celluloses such as carboxymethyl cellulose, polyvinyl pyrrolidine, polymeric polycarboxylate materials, and ethoxylated amides. Preferably the antiredeposition agent comprises carboxymethyl cellulose for reasons of efficacy.
- DETD Optical Brightener: The laundry detergent **pellet** may also comprise about 0-5 wt-% of an optical brightener, preferably about 0.1-1.0 wt-%.
- DETD Nonionic Surfactant: The laundry detergent **pellet** may also comprise about 0-50 wt-% of a nonionic surfactant, preferably about 10-40 wt-%, and most preferably about 20-30 wt-%. Suitable nonionic surfactants include but are not limited to the following: propoxylated and/or ethoxylated alkyl phenols, propoxylated and/or ethoxylated aliphatic alcohols and carboxylic esters. For reasons of effective detergency, low cost, ease of availability, and low foam, the preferred nonionic surfactants are ethoxylated nonyl phenols having 9-10 moles of ethoxylate and C.sub.12 -C.sub.15 linear alcohols having 7-9 moles of ethoxylate.
- DETD Anionic Surfactant: The laundry detergent **pellet** may also comprise about 0-20 wt-% of an anionic surfactant, preferably about 5-15 wt-% for reasons of particulate soil dispersion. Suitable anionic surfactants include but are not limited to the following: linear alkyl benzene sulfonate, alcohol sulfate, alcohol ether sulfate and alpha olefin sulfonates. Preferably the anionic surfactant comprises a linear alkyl benzene sulfonate for reasons of cost and efficacy.
- DETD Sodium Carbonate: The laundry detergent **pellet** may also comprise about 0-80 wt-% sodium carbonate.
- DETD Fragrance: The laundry detergent **pellet** may also comprise about 0-1.0 wt-% of a fragrance, preferably about 0.05-0.5 wt-%.
- DETD Water of Hydration: The laundry detergent **pellet** may also comprise about 0-30 wt-% water of hydration, preferably about 0 to 15 wt-% for reasons of ensuring a strong **pellet** that resists breakage and dusting and concentrating the product actives.
- DETD The following example demonstrates the good dissolution rate of a water soluble bag of the present invention containing a **pelletized** silicate laundry detergent functional composition. A water soluble bag having the following dimensions: 7 1/2 inches length, 10 inches width and a thickness of 1.5 mils and comprising a polyvinyl alcohol film bag purchased from Chris Craft Industries, Inc. having the properties set forth in Table A containing 3 lbs. of **pellets** is inserted into a dispenser. The silicate laundry detergent **pellets** have the following composition:
- DETD The water soluble bag containing the **pellets** is contacted with water having a temperature of 135.degree.-155.degree. F. in order to form a solution. The solution is formed and transferred to a 30 gallon tank containing 25 gallons of fresh water. By means of an ionic sensor it is determined that it takes less than about 3 minutes for the tank to reach the desired concentration.
- DETD 1(b). LAUNDRY COMPOSITION--FORMULA II--LAUNDRY SOFTENING **PELLET**
- DETD Formula II comprises a laundry softening **pellet**.

- DETD Moderate pH Acid: The laundry softening **pellet** can comprise about 50-100 wt-% of a moderate pH acid, preferably about 70-90 wt-% for reasons of reducing linen pH to prevent skin irritation and enhance rinsing of water hardness salts. Suitable moderate pH acids include but are not limited to the following: ammonium silico fluoride, sodium silicofluoride, tartaric acid, citric acid, oxalic acid, sodium acid fluoride and ammonium acid fluoride. Preferably the moderate pH acid comprises ammonium silico fluoride for reasons of solubility, toxicity and cost.
- DETD The laundry softening **pellet** also comprises about 50-100 wt-%, preferably about 10-50 wt-%, and most preferably about 20-40 wt-% of a quaternary surfactant.
- DETD Optical Brightener: The laundry softening **pellet** may also comprise about 0-2 wt-% of an optical brightener, preferably about 0.1-0.4 wt-%.
- DETD Fragrance: The laundry softening **pellet** may also comprise about 0-2 wt-% of a fragrance, preferably about 0.1-0.5 wt-%.
- DETD Iron Control Agent: The laundry softening **pellet** may also comprise about 0-20 wt-% of an iron control agent, preferably about 5-15 wt-% for reasons of reducing yellowing caused by iron deposits. Suitable iron control agents include but are not limited to the following: oxalic acid, citric acid, such as HEDP (hydroxyethylene diphosphonic acid), sodium or ammonium acid fluoride and organic amino polycarboxylated compounds such as nitrilotriacetic acid and ethylene diamine diacetic acid.
- DETD Water of Hydration: The laundry softening **pellet** may also comprise about 0-43 wt-% water of hydration, preferably about 0-15 wt-% for reasons of reducing the percentage of inactive materials in the formulation.
- DETD Enzyme: The laundry softening **pellet** may also comprise about 0-5 wt-% of an enzyme, preferably about 1-4 wt-% for reasons of protein and starch stain removal. Suitable enzymes include but are not limited to the following: amylase, protease, lipase and cellulase.
- DETD The following example demonstrates the good dissolution rate of a water soluble bag of the present invention containing a laundry softening **pelletized** functional composition. A water soluble bag having the following dimensions: 7 1/2 inches length, 6 inches width and a thickness of 1.5 mils and comprising a polyvinyl alcohol film bag purchased from Chris Craft Industries, Inc. having the properties set forth in Table A containing 1 lb. of **pellets** is inserted into a dispenser.
- DETD The laundry softening **pellet** composition is as follows:
- DETD The water soluble bag containing the **pellets** is contacted with water having a temperature of 135.degree.-155.degree. F. in order to form a solution. The solution is transferred to a 30 gallon tank containing 25 gallons of fresh water. By means of an ionic sensor it is determined that it takes less than 3 minutes for the tank to reach the desired concentration.
- DETD We believe that a multiple use amount of a **pelletized** warewashing composition may be used in the water soluble bag of the present invention.
- DETD Sequestering Agent: The **pelletized** metasilicate based warewashing composition of this invention preferably comprises about 10 to 70 wt-%, of a sequestering agent, preferably about 30 to 40 wt-% for reasons of effective sequestering of hardness ions.
- DETD Alkali Metal Silicate: The **pelletized** metasilicate based warewashing composition of this invention can comprise about 10 to 70 wt-% of an alkali metal silicate. Preferably the **pelletized** warewashing composition comprises about 30 to 60 wt-% of an alkali metal silicate for reasons of supplying alkalinity, and most preferably about 40 wt-% of an alkali metal metasilicate for reasons of supplying sufficient alkalinity.
- DETD Methods of manufacturing alkali metal silicates having various x:y mole ratios are well known as demonstrated by the general disclosure in the Kirk-Othmer Encyclopedia of Chemical Technology, 2d Ed., Vol. 18, pp. 139-141. The desired properties and benefits of the **pelletized**

warewashing composition described herein can be obtained using an alkali metal silicate having an x:y ratio of about 1:1-3:1, preferably 1:1. At these ratios, the alkali metal silicate has sufficient alkaline character to clean effectively and sufficient silicon dioxide to protect aluminum, china, glassware, etc. from the etchant effect of basic components in the composition.

- DETD Secondary Sequestering Agent: The **pelletized** metasilicate based warewashing composition of this invention can comprise about 0 to 10 wt-% of a secondary sequestering agent. Preferably, the **pelletized** warewashing composition comprises about 0 to 4 wt-% of an secondary sequestering agent for reasons of better product performance.
- DETD Filler: The **pelletized** metasilicate based warewashing composition of the present invention can also comprise about 0 to 60 wt-% of a filler. Preferably the **pelletized** warewashing composition comprises about 0-40 wt-% of a filler for reasons of cost, and most preferably about 18-22 wt-% for reasons of cost.
- DETD Suitable fillers include but are not limited to the following: sodium carbonate, and **sodium sulfate**.
- DETD The more fillers the **pellet** contains, the less expensive the **pellet**. Preferably, the filler comprises sodium carbonate for economic reasons and the fact that sodium carbonate services as an additional source of alkalinity.
- DETD Bleaching Source: The **pelletized** metasilicate based warewashing composition may also comprise about 0.1-10 wt-% of a bleaching source. Preferably the **pelletized** warewashing composition contains about 1-6 wt-% of a bleaching source, for reasons of detaining, and most preferably about 2-3 wt-% for reasons of cost coupled with good destaining.
- DETD Bleaches suitable for use in the **pelletized** warewashing composition include any of the well known bleaching agents capable of removing stains from such substrates as dishes, flatware, pots and pans, textiles, countertops, appliances, flooring, etc. without significantly damaging the substrate. A nonlimiting list of such bleaches include bleaches such as hypochlorites, chlorites, chlorinated phosphates, chloroisocyanates, chloroamines, etc.; and peroxide compounds such as hydrogen peroxide, perborates, percarbonates etc. Preferred bleaches include those bleaches which liberate an active halogen species such as Cl.sup.+, Br.sup.+, OCl.sup.-, or OBr.sup.- under conditions normally encountered in typical cleaning processes. Most preferably, the bleaching agent releases Cl.sup.+ or OCl.sup.-. A nonlimiting list of useful chlorine releasing bleaches includes calcium hypochlorite, lithium hypochlorite, chlorinated trisodium phosphate, sodium dichloroisocyanurate, potassium dichloroisocyanurate, pentaisocyanurate, trichloromelamine, sulfondichloro-amide, 1,3-dichloro -5,5dimethyl hydantoin, n-chlorosuccinimide, n,n'-dichloroazodicarbonimide, n,n'-chloroacetyl urea, n,n'-dichlorobiuret, trichlorocyanuric acid, and hydrates thereof.
- DETD Defoaming Surfactant: The **pelletized** metasilicate based warewashing composition of the present invention may also comprise about 0-10 wt-% of a defoaming surfactant.
- DETD Additional Ingredients: The **pelletized** warewashing composition may also further comprise 0-10 wt-% a dye and 0-10 wt-% fragrance.
- DETD The **pelletized** functional composition of the present invention can be manufactured by a number of processes, included but not limiting to the following: a batch process and a continuous process.
- DETD In the batch process, sodium metasilicate, low density tripolyphosphate, surfactant, soda ash, and dry polyacrylate are added in any order to a ribbon blender or a Nauta mixer. The last item added is the chlorine source (sodium dichloroisocyanurate dihydrate). The various dry ingredients are mixed for 5-10 minutes, collected in drums and fed through a belt feeder to the **pelletizer**.
- DETD The premixed product is fed to a model 25C59 **pelletizer** manufactured by Strong-Scott which is equipped with a double roll and a vertical screw. The screw serves to force the premixed product between the rolls. The rolls rotate at about 15 r.p.m. and form **pellets**

at a rate of 1,000 pounds of **pellets** per hour. The hydraulic pressure is set at 2,200 psig. **Pellets** formed at the **pelletizer** drop onto a 3 foot diameter screener equipped with a 1/2 inch mesh screen. The screen serves to deburr the **pellets**. Fines are recycled back to the ribbon blender or Nauta mixer. The finished **pellet** product is collected and packaged.

DETD The following example demonstrates the good dissolution rate of **pellets** prepared according to this invention. 5 lbs. of metasilicate based warewashing **pellets** having the following composition:

DETD The following example demonstrates the good dissolution rate of a water soluble bag of the present invention containing a **pelletized** functional composition. A water soluble bag having the following dimensions: 14 inches length, 7 1/2 inches width and a thickness of 1.5 mils and comprising a polyvinyl alcohol film bag purchased from Chris Craft Industries, Inc. having the properties set forth in Table A and containing 5 lbs. of **pellets** was inserted into a dispenser. The **pellets** had the same composition as the **pellets** disclosed in Example 3. The water soluble bag containing the **pellets** was contacted with water having a temperature of

135-155.degree. F. in order to form a solution. The solution thus formed was transferred to a 30 gallon tank containing 25 gallons of fresh water. By means of an ionic sensor it was determined that it took only 3 minutes and 7 seconds for the tank to reach the desired concentration.

DETD The following test data demonstrates the superior performance exhibited by our metasilicate based warewashing **pellets** contained in a water soluble bag when compared with powdered warewashing detergents.

DETD For the next two or three months, our article comprising a water soluble container containing **pelletized** warewashing composition was utilized in the dispensers in place of the powdered detergents.

DETD It was determined that the warewashing results obtained from use of our invention were equal to the results obtained by use of the powdered compositions, even though a lower usage of our **pelletized** products was used as compared to the powdered products.

DETD Our metasilicate based warewashing **pellets** which were tested, **Pellet A** and **Pellet B**, had the following formulas:

DETD The **Pellet A** **pellets** had the formula set forth in Example 3.

DETD The **Pellet B** **pellets** had the following formula:

DETD Five pounds of **Pellet B** **pellets** were contained in a water soluble bag having the properties of the water soluble bag described in Example 4.

DETD Five pounds of **Pellet A** **pellets** were contained in a water soluble bag as described in Example 4.

DETD The three powdered products, which we tested our article containing **Pellet A** and our article containing **Pellet B** **pellets** against, had the following, formulas:

DETD

Wt-%                      Ingredient

---

Powdered Product I

18.0	sodium tripolyphosphate
48.8	sodium carbonate
2.6	sodium polyacrylate
29.0	sodium metasilicate
1.6	sodium dichloroisocyanurate dihydrate

Powdered Product II

4.2	sodium carbonate
1.5	sodium polyacrylate
1.8	sodium dichloroisocyanurate dihydrate
8.8	sodium chloride
1.0	alkyl phosphate ester
22.4	sodium hydroxide
22.5	sodium tripolyphosphate

Powdered Competitor Product III

14.3	sodium tripolyphosphate
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35.7	sodium carbonate
1.0	sodium polyacrylate
1.0	sodium dichloroisocyanurate dihydrate
22.0	sodium chloride
1.0	alkyl phosphate ester
25.0	sodium hydroxide

Test No.	Average usage of powdered product	
	Average usage of to obtain	Number of Tests
	<b>pellet</b> product	equal results

1.	<b>Pellet A</b> - 0.16	0.23 Product II 7
2.	<b>Pellet B</b> - 0.127	0.192 Product I 4
3.	<b>Pellet A</b> - 0.17	0.22 Product III 6
4.	<b>Pellet B</b> - 0.134	0.187 Product II 4
5.	<b>Pellet B</b> - 0.13	0.2 Product II 5
6.	<b>Pellet B</b> - 0.115	0.145 Product III 5

DETD As the data above demonstrates in each test a larger usage of the powder products had to be utilized in order to achieve a result equal to that obtained with a smaller usage of our articles containing **pelletized** functional composition.

DETD The following table sets forth the formula and preparation procedure for a caustic warewashing **pellet** 4 which could be used in the water soluble bag 3 of the present invention.

DETD Alkali Metal Hydroxide: The caustic warewashing **pellet** may comprise about 15-70 wt-% of an alkali metal hydroxide, preferably 25-50 wt-%, and most preferably 40 wt-% for reasons of cleaning performance. Suitable alkali metal hydroxides include but are not limited to the following: potassium hydroxide, sodium hydroxide, or mixtures of potassium and sodium hydroxide.

DETD Inorganic Sequestering Agent: The caustic warewashing **pellet** may comprise about 10-50 wt-% of an inorganic sequestering agent, preferably about 25-45 wt-% for reasons of hard water control, and most preferably about 35 wt-% for reasons of economy and legal restrictions on phosphorous content. Suitable inorganic sequestering agents include but are not limited to the following: tetrasodium pyrophosphate, tetrapotassium pyrophosphate, sodium tripolyphosphate, potassium tripolyphosphate. The preferred inorganic sequestering agent is sodium tripolyphosphate, for reasons of availability and economy of use.

DETD Bleaching Source: The caustic warewashing **pellet** may comprise about 0-8 wt-% of a bleaching source, preferably about 2-6 wt-% for reasons of economy, and most preferably about 5 wt-% for reasons of cost effectiveness. Suitable bleaching sources include but are not limited to the following: calcium hypochlorite, lithium hypochlorite, chlorinated trisodium phosphate, sodium dichloroisocyanurate dihydrate, potassium dichloroisocyanurate dihydrate, sodium dichloroisocyanurate, and potassium dichloroisocyanurate. Preferably, the bleaching source comprises sodium dichloroisocyanurate dihydrate for reasons of

availability and economy.

DETD Filler: The caustic warewashing **pellet** may comprise about 0-40 wt-% of a filler, preferably 10-30 wt-%, and most preferably about 15 wt-% for reasons of cost effectiveness. Suitable fillers include but are not limited to the following: sodium carbonate, sodium silicate, sodium metasilicate, sodium borate, and sodium chloride. Sodium carbonate is the preferred filler for reasons of cost effectiveness and that it provides an additional source of alkalinity.

DETD Organic Sequestering Agent: The caustic warewashing **pellet** may also comprise about 0-7 wt-% of an organic sequestering agent, preferably about 2-5 wt-% for reasons of economy, and most preferably about 3 wt-% for reasons of cost effectiveness.

DETD Defoaming Surfactant: The caustic warewashing **pellet** may comprise about 0-5 wt-% of a defoaming surfactant, preferably about 1-3 wt-% for reasons of performance, and most preferably about 2 wt-% for reasons of cost effectiveness.

DETD Preparation Procedure: To form the caustic warewashing **pellets** of the present invention all ingredients can be dry blended in an appropriate mixer such as a ribbon mixer in order to form a uniform mixture. This mixture is then **pelletized** to form

**pellets** having a mass of about 5 to 15 grams using a **pelletizing** machine.

DETD The following Example demonstrates the good dissolution rate of a water soluble bag of the present invention containing a caustic warewashing **pelletized** functional composition. A water soluble bag having the following dimensions: 12 inches length, 7 1/2 inches width and a thickness of 1.5 mils and comprising a polyvinyl alcohol film bag purchased from Chris Craft Industries, Inc. having the properties set forth in Table A containing 5 lbs. of **pellets** is inserted into a dispenser.

DETD The caustic based warewashing **pellet** composition:

DETD The water soluble bag containing the **pellets** is contacted with water having a temperature of 135.degree.-155.degree. F. in order to form a solution. The solution formed is transferred to a 30 gallon tank containing 25 gallons of fresh water. By means of an ionic sensor it is determined that it took less than 3 minutes for the tank to reach the desired concentration.

DETD The **pelletized** functional composition of the present invention may also comprise a presoak composition.

DETD Various **pelletized** presoak compositions may be used in the water soluble bag of the present invention. An example of a **pelletized** silverware presoak and detarnisher composition which could be used in the water soluble bag of the present invention is the following:

DETD

#### **Pelletized Presoak Composition**

Raw Material	Wt-% Most Preferred	Wt-% Broad	Wt-% Preferred
1. Sequestering agent	24	10-34	20-30
2. Conductive filler	62.74	10-70	50-70
3. Nonionic surfactant	3.00	1-5	2-4
4. Anionic surfactant	3.00	1-5	2-4
5. Water	6.00	1-30	1-10
6. Enzyme	1.0	0.01-5.0	0.5-2.0
7. Dye	0.06	0-0.10	0.05-0.07
8. Fragrance	0.20	0-0.5	0.05-0.3

- DETD The **pelletized** presoak composition may comprise about 10-34 wt-% of a builder or a sequestering agent. Preferably the **pelletized** presoak composition contains about 20-30 wt-% of a builder or sequestering agent and most preferably about 24 wt-%. Suitable builders or sequestering agents include but are not limited to the following: sodium tripolyphosphate, EDTA (ethylene diamine tetra acetic acid), tetrasodium pyrophosphate, zeolites, citric acid, polyacrylates, NTA (nitrilotriacetic acid), and sodium carbonate. Preferably the builder or sequestering agent comprises sodium tripolyphosphate for reasons of water hardness control and cost.
- DETD Conductive Filler: The **pelletized** presoak composition may also comprise about 10-70 wt-% of a conductive filler, preferably about 50-70 wt-% for reasons of cost and dispensing control and most preferably about 62.74 wt-% for reasons of cost and dispensing control. The conductive filler serves to increase the conductivity of the water which is necessary in order to detarnish silverware. Suitable conductive fillers include but are not limited to the following: soda ash, **sodium sulfate**, sodium chloride, borax, sodium bicarbonate and sodium sesquicarbonate. Preferably the conductive filler comprises soda ash for reasons of cost, processing and dispensing control.
- DETD Nonionic Surfactant: The **pelletized** presoak composition may also comprise about 1-5 wt-% of a nonionic surfactant, preferably about 2-4 wt-% for reasons of wetting, and most preferably about 3 wt-% of a nonionic surfactant for reasons of wetting.
- DETD Anionic Surfactant: The **pelletized** presoak composition may also comprise about 1 to 5 wt-% of an anionic surfactant, preferably about 2 to 4 wt-%, for reasons of wetting, and most preferably about 3 wt-% for reasons of wetting. Suitable anionic surfactants include but are not limited to the following: sulframin, alphaolefinsulfonate, **sodium lauryl sulfate**. Preferably, the anionic surfactant comprises sulframin for reasons of optimum wetting.
- DETD Enzyme: The **pelletized** presoak composition may also comprise about 0.01 to 5.0 wt-% of an enzyme, preferably about 0.5 to 2.0 wt-% for reasons of soil removal and most preferably about 1.0 wt-% of an enzyme for reasons of soil removal. Suitable enzymes include but are not limited to the following: esperase, amylase, lipase, and combinations thereof. Esperase serves to break down protein, whereas amylase breaks down starch and lipase breaks down fats. If three enzymes are utilized in the presoak composition, the broad range for each enzyme would range from between about 0.1 to 5.0 wt-%. Thus, the presoak can comprise up to 15 wt-% enzyme if three different enzymes are utilized.
- DETD Water: The **pelletized** presoak composition may also comprise about 1-30 wt-% water, preferably about 1-10 wt-% for reasons of dispensing control and cost, and most preferably about 6.0 wt-% water for reasons of dispensing control and cost. Water helps aid in the **pelletization** process and also acts as a filler.
- DETD Dye: The **pelletized** presoak composition may also comprise about 0 to 0.10 wt-% of a dye, preferably about 0.05 to 0.07 wt-% for reasons of aesthetics, and most preferably about 0.06 wt-% for reasons of aesthetics. Suitable dyes include any dye stable at pH's of above 10.
- DETD Fragrance: The **pelletized** presoak composition may also comprise about 0 to 0.5 wt-% of a fragrance, preferably about 0.05 to 3 wt-%, for reasons of aesthetics, and most preferably about 0.20 wt-% for reasons of aesthetics. Suitable fragrances include any that are compatible in the overall system.
- DETD The **pelletized** presoak composition can be formed by either batch or continuous processing. The **pelletized** presoak composition can be manufactured according to the following procedure.
- DETD Presoak Pellet Preparation: The **pelletized** presoak composition can be formed by either batch or continuous processing. The following is an example of a batch production process. 25 wt-% of a dry, powdered or **granular** sequestering agent or builder (sodium tripolyphosphate) is charged to a 100 lb. mix tank and agitation is begun. A dye is then dissolved in 4 wt-% water and sprayed onto the sodium tripolyphosphate while agitation continues until a uniform color

is achieved.

- DETD The premixed product is fed to a Model 25CS9 **pelletizer** manufactured by Strong-Scott which is equipped with a double roll and a vertical screw. The screw serves to force the premixed product between the rolls. The rolls rotate at about 15 r.p.m. and form **pellets** at a rate of about 1,000 lbs. of **pellets** per hour. The hydraulic pressure is set at 2,200 psig. **Pellets** formed at the **pelletizer** drop onto a 3' diameter screener equipped with a 1/2" mesh screen. The screen serves to deburr the **pellets**. Fines are recycled back to the mixer. The finished **pellet** product is collected and packaged.
- DETD The following example demonstrates the good dissolution rate of a water soluble bag of the present invention containing a **pelletized** presoak functional composition. A water soluble bag having the following dimensions: 14 inches length, 7 1/2 inches width and a thickness of 1.5 mils and comprising a polyvinyl alcohol film bag purchased from Chris Craft Industries, Inc. having the properties set forth in Table A containing 5 lbs. of **pellets** is inserted into a dispenser.
- DETD The water soluble bag containing the **pellets** is contacted with water having a temperature of 135.degree.-155.degree. F. in order to form a solution. The solution formed is transferred to a 30 gallon tank containing 25 gallons of fresh water. By means of an ionic sensor it is determined that it took less than 3 minutes for the tank to reach the desired concentration.
- DETD 4. GENERAL PURPOSE FLOOR AND WALL CLEANER AND MANUAL DISHWASHING  
**PELLET**
- DETD The following general purpose floor and wall cleaner and manual dishwashing **pellet** can be used in the water soluble bag of the present invention.
- DETD Filler: The general purpose **pellet** can comprise about 0-85 wt-% of a filler. Suitable fillers include but are not limited to the following: **sodium sulfate**, sodium chloride, and other neutral soluble salts. Preferably the filler is **sodium sulfate** for reasons of minimizing corrosion to soft metals.
- DETD Anionic Surfactant: The general purpose **pellet** can comprise about 5-70 wt-% of an anionic surfactant, preferably about 5-35 wt-% for reasons of cost and performance. Suitable anionic surfactants include but are not limited to the following: linear dodecyl benzene sulfonate, alcohol ethoxy sulfates, alkano sulfonates, alkali and alkaline earth salts. A high concentration of anionic surfactant results in a **pellet** which can be **pelletized** easier and also a **pellet** which performs better when dissolved in water. However, a low concentration of anionic surfactant results in a **pellet** that is more inexpensive.
- DETD Nonionic Surfactant: The general purpose **pellet** comprises can comprise about 0-30 wt-% of a nonionic surfactant. Preferably the nonionic surfactant is included in an amount such that about 1 part nonionic surfactant is included for about every 2 parts of anionic surfactant. Suitable nonionic surfactants include but are not limited to the following: fatty acid amides, ethylene oxide, and/or propylene oxide adducts of alcohols.
- DETD Corrosion Inhibitor: The general purpose **pellet** may also comprise about 0 to 5 wt-% of a corrosion inhibitor such as a low alkaline silicate such as sodium silicate or potassium silicate, preferably sodium silicate. Preferably the ratio of M.sub.2 O:SiO.sub.2 is less than about 1:1.
- DETD The general purpose **pellets** are formed by conventional high-pressure **pellet** production methods. Such methods involve combining **granular**-or powdered **anhydrous** materials, mixing them to form a premixed product and then transferring the premixed product to a **pelletizer**.
- DETD The following example demonstrates the good dissolution rate of a water soluble bag of the present invention containing a **pelletized** general purpose functional composition. A water soluble bag having the following dimensions: 12 inches length, 7 1/2 inches width and a thickness of 1.5 mils and comprising a polyvinyl alcohol film bag

purchased from Chris Craft Industries, Inc. having the properties set forth in Table A containing 4 lbs. of **pellets** was inserted into a dispenser.

DETD The **pellets** had the following composition:

Ingredients	Wt-%
1. Sodium sulfate	82.4
2. Linear dodecyl benzene sulfonate	14.7
3. Low alkaline sodium silicate	1.0
4. Dye	.0075
5. Diatomaceous Earth - (flow agent)	1.0
6. Emollient	.3925
7. Sodium polyacrylate	.5

DETD The water soluble bag containing the **pellets** was contacted with water having a temperature of 135-155.degree. F. in order to form a solution. The solution thus formed was transferred to a 30 gallon tank containing 25 gallons of fresh water. By means of an ionic sensor it was determined that it took less than 3 minutes and 10 seconds for the tank to reach the desired concentration.

DETD 5. HARD SURFACE CLEANER **PELLET**

DETD The following **pelletized** hard surface cleaner can be used in the water soluble bag of the present invention.

DETD The **pelletized** hard surface can comprise about 12.0-18.0 wt-% of a buffering agent, preferably about 15.0 suitable buffering agents include but are not limited to the following: sodium bicarbonate, mixtures of sodium bicarbonate and sodium carbonate, disodium phosphate, trisodium phosphate, monosodium phosphate, mixtures of disodium phosphate and trisodium phosphate, borates such as sodium tetra borate and borax, and combinations of carbonates and phosphates. Suitable combinations of carbonates and phosphates have a weight ratio about 1:1 resulting in a pH of about 9-10.

DETD The **pelletized** hard surface cleaner can comprise about 8.0-12.0 wt-% of an alkalinity and ammonium source, preferably about 10.0 wt-%. Suitable sources include but are not limited to the following: ammonium bicarbonate, ammonium phosphate, diammonium phosphate, a mixture of ammonium chloride and sodium carbonate and other sources capable of forming ammonium ions in solution.

DETD The composition can also comprise about 12.0-18.0 wt-% of an inorganic sequestering agent preferably about 15.0 wt-%. Suitable sequestering agents include but are not limited to those set forth as being suitable for use in the laundry detergent **pellet**.

DETD Preferably the sequestering agent comprises a low density sodium tripolyphosphate bead. A bead is preferred over a powder in that it can be crushed which results in a stronger nonfriable **pellet**.

DETD The **pelletized** hard surface cleaner can also comprise about 22.0-28.0 wt-% of an anionic surfactant, preferably about 25 wt-%. Suitable anionic surfactants include but are not limited to the following: sodium dodecyl benzene sulfonate, sodium

**lauryl sulfate** and other anionic surfactants which result in a **pellet** that is non pasty.

DETD The **pelletized** hard surface cleaner can also comprise about 22.0-28.0 wt-% of a nonionic surfactant preferably about 15.0 wt-%. Such nonionic surfactants should be high foaming. Suitable nonionic surfactants include but are not limited to the following: fatty alcohol ethoxylates which are the reaction products of alkyl phenols such as nonyl phenol and octyl phenol with ethylene oxide.

DETD The **pelletized** hard surface cleaner can also comprise about 8.0-12.0 wt-% of an organic sequestering agent, preferably about 10.0 wt-%.

DETD The following example demonstrates the good dissolution rate of a water

soluble bag of the present invention containing a **pelletized** hard surface cleaner function composition. A water soluble bag having the following dimensions: 14 inches length, 7 1/2 inches width and a thickness of 1.5 mils and comprising a polyvinyl alcohol film bag purchased from Chris Craft Industries, Inc. having the properties set forth in Table A containing 5 lbs. of **pellets** 13 are inserted into a dispenser.

DETD The water soluble bag containing the **pellets** is contacted with water having a temperatures of 135-155.degree. F. in order to form a solution. The solution formed is transferred to a 30 gallon tank containing 25 gallons of fresh water. By means of an ionic sensor it is determined that it takes less than 3 minutes for the tank to reach the desired concentration.

CLM What is claimed is:

1. An article of manufacture which comprises: (a) a dispenser containing an aqueous liquid spray means; (b) a sealed water soluble container; and (c) an institutional multiple use amount of greater than about 200 grams of a **pelletized** water soluble or dispersible functional composition contained within said water soluble container, wherein said water soluble container fits within said dispenser and is capable of forming an aqueous solution by action of said liquid spray on said **pelletized** functional composition, and said **pelletized** functional composition comprises: (i) about 10-34 wt-% of a sequestering agent; (ii) about 10-70 wt-% of a conductive filler; (iii) about 1-5 wt-% of a nonionic surfactant; and (iv) about 1-5 wt-% water; whereby said conductive filler provides electrical conductivity to an aqueous solution or dispersion of said functional composition.

2. The article of claim 1 wherein the **pelletized** functional composition further comprises about 0 to 0.10 wt-% of a dye.

3. The article of claim 1 wherein the **pelletized** functional composition further comprises about 0 to 0.5 wt-% of a fragrance.

6. The article of claim 1 wherein the water soluble container comprises a water soluble polymer selected from the group consisting of a polyvinyl alcohol, **polyvinyl acetate**, polyvinyl pyrrolidine or mixtures thereof.

7. The article of claim 1 wherein the water soluble container contains about 200 grams to 5,000 grams of **pelletized** functional material.

8. The article of claim 1 wherein each **pellet** has a mass of about 2 to 30 grams.

9. The article of claim 1 wherein each **pellet** has a width ranging from about 5 to 30 mm., a height ranging from about 10 to 80 mm. and a depth ranging from about 10 to 30 mm.

10. The article of claim 1 wherein the water soluble container will dissolve when exposed to a water spray having a minimum water temperature of about 40.degree. F. and a minimum nozzle pressure of about 25 to 30 psig such that the **pelletized** functional material is exposed in about 0.5-3 minutes.

11. The article of claim 7 wherein the conductive filler is soda ash, **sodium sulfate**, sodium chloride, borax, sodium bicarbonate or sodium sesquicarbonate.

13. An article of manufacture which comprises: (a) a dispenser containing an aqueous liquid spray means; (b) a sealed water soluble container; and (c) an institutional multiple use amount of greater than about 200 grams of a **pelletized** water soluble or dispersible functional composition contained within said water soluble container, wherein said water soluble container fits within said dispenser and is

capable of forming an aqueous solution by action of said liquid spray on said **pelletized** functional composition, and the **pelletized** functional composition comprises: (i) an effective buffering amount of a buffering agent; (ii) an effective amount of an alkalinity and ammonium source to provide a source of mild alkalinity and desired amount of ammonia; (iii) about 8-30 wt-% of a sequestering agent; and (iv) about 12-28 wt-% of a surfactant.

16. The article of claim 13 wherein the water soluble container comprises a water soluble polymer selected from the group consisting of a polyvinyl alcohol, **polyvinyl acetate**, polyvinyl pyrrolidine or mixtures thereof.

17. The article of claim 13 wherein the water soluble container contains about 200 grams to 5,000 grams of **pelletized** functional material.

18. The article of claim 13 wherein each **pellet** has a mass of about 2 to 30 grams.

19. The article of claim 13 wherein each **pellet** has a width ranging from about 5 to 30 mm., a height ranging from about 10 to 80 mm., and a depth ranging from about 10 to 30 mm.

20. The article of claim 13 wherein the water soluble container will dissolve when exposed to a water spray having a minimum water temperature of about 40.degree. F. and a minimum nozzle pressure of about 25 to 30 psig such that the **pelletized** functional material is exposed in about 0.5-3 minutes.

IT 9002-89-5, Poly(vinyl alcohol) **9003-20-7**, Poly(vinyl acetate)  
 9003-39-8, Poly(vinylpyrrolidone)  
 (containers, water-sol., for dispensing of detergent compns.)  
 IT **9003-20-7**, Poly(vinyl acetate)  
 (containers, water-sol., for dispensing of detergent compns.)  
 RN 9003-20-7 USPATFULL  
 CN Acetic acid ethenyl ester, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 108-05-4

CMF C4 H6 O2

AcO-CH=CH<sub>2</sub>

L71 ANSWER 4 OF 8 USPATFULL  
 AN 92:660 USPATFULL  
 TI **Article** comprising a water soluble bag containing a multiple use amount of a **pelletized** functional material and methods of its use  
 IN Gladfelter, Elizabeth J., Falcon Heights, MN, United States  
 Slocumb, Sheryl D., New Brighton, MN, United States  
 PA Ecolab Inc., St. Paul, MN, United States (U.S. corporation)  
 PI US 5078301 19920107  
 AI US 1990-515361 19900426 (7)  
 RLI Continuation of Ser. No. US 1989-368085, filed on 16 Jun 1989, now abandoned which is a continuation of Ser. No. US 1987-104458, filed on 2 Oct 1987, now abandoned  
 DT Utility  
 EXNAM Primary Examiner: Olszewski, Robert P.; Assistant Examiner: Noland, Kenneth  
 LREP Merchant, Gould, Smith, Edell, Welter & Schmidt  
 CLMN Number of Claims: 18

ECL Exemplary Claim: 1  
DRWN 3 Drawing Figure(s); 1 Drawing Page(s)  
LN.CNT 1698

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB An article comprising a water soluble container containing a multiple use amount of a **pelletized** functional composition such as a fabric treatment composition, a warewashing composition, a laundry composition, a pot and pan presoak composition, a silverware presoak composition, a floor cleaner composition, a rinse additive composition, a disinfectant composition, a sanitizer composition, a general purpose cleaner composition, etc. The article may be optionally enclosed in a water impervious outerwrap. A method for using the article by placing the article inside a dispenser wherein the article is contacted with water having a sufficient temperature and pressure to dissolve the water soluble bag and the **pelletized** functional material contained therein in order to form a solution.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

TI **Article** comprising a water soluble bag containing a multiple use amount of a **pelletized** functional material and methods of its use

AB An article comprising a water soluble container containing a multiple use amount of a **pelletized** functional composition such as a fabric treatment composition, a warewashing composition, a laundry composition, a pot and pan presoak composition, a silverware presoak composition, a floor cleaner composition, a rinse additive composition, a disinfectant composition, a sanitizer composition, a general purpose cleaner composition, etc. The article may be optionally enclosed in a water impervious outerwrap. A method for using the article by placing the article inside a dispenser wherein the article is contacted with water having a sufficient temperature and pressure to dissolve the water soluble bag and the **pelletized** functional material contained therein in order to form a solution.

SUMM The invention relates to an article comprising a water soluble bag containing a multiple use amount of a **pelletized** water soluble or dispersible functional material. A fabric treatment composition, warewashing composition, a laundry composition, a pot and pan presoak composition, a silverware presoak composition, a floor cleaner composition, a rinse additive composition, a disinfectant composition, a sanitizer composition, a general purpose cleaner composition, etc. all can be packaged and dispersed from the water soluble bag.

SUMM More particularly, the invention relates to an article comprising a water soluble bag containing a multiple use amount of a **pelletized** functional composition which can be used in a dispenser wherein the water soluble bag is dissolved upon contact with a spray or stream of water from the dispenser exposing the **pellets** to the water. Upon contact with water, the **pellets** in the dispenser dissolve over a period of time, forming a use solution.

SUMM Single use domestic detergent packets comprising powdered or **pelletized** detergent within a water soluble single use packet are known in the art. See Dunlop, U.S. Pat. No. 3,198,740. Such packets are intended for direct insertion into the wash water contained in a washing machine and are not intended for use in a dispenser. Each packet equals one use or application. In addition, such packets are intended for domestic rather than institutional use.

SUMM I have found that the drawbacks of powder use generally can be solved by an article of manufacture comprising a sealed water soluble container enclosing as little as about 200 grams, of a **pelletized** functional composition.

SUMM I have found the drawbacks of powdered warewashing detergent use can be solved by an article of manufacture comprising a sealed water soluble container enclosing typically at least about 900 grams of a

**pelletized** warewashing functional composition.

- SUMM The amount of **pelletized** composition contained in the article can vary according to a number of factors including but not limited to the following: the dispenser size, the intended use of the solution formed, the **pellet** composition, etc.
- DRWD FIG. 1 is a front perspective view with portions thereof broken away for ease of installation of a dispenser in which is situated an article comprising a water soluble bag containing **pelletized** functional material.
- DRWD FIG. 2 is a front elevational view with portions thereof broken away of the article comprising a water soluble bag containing a functional **pelletized** material shown in FIG. 1 which further comprises a moisture impervious outerwrap.
- DRWD FIG. 3 is a front elevational view taken in section generally through the center of the dispenser in which is situated an article which is resting upon **pelletized** functional material which was previously enclosed in a water soluble container which has dissolved.
- DETD Referring to the drawings, wherein, like numerals represent like parts throughout the several views; there is generally designated an article 16 comprising a sealed water soluble bag 3 containing a **pelletized** functional composition 4 situated in a dispenser 5.  
(See FIG. 1.)
- DETD There is also generally designated an article 16 comprising a sealed water soluble bag 3 containing a **pelletized** functional composition 4 further contained within a removable water impervious outerwrap 2. (See FIG. 2.)
- DETD Polyvinyl alcohol, **polyvinyl acetate**, methyl cellulose, hydroxyethyl cellulose, carboxymethyl cellulose, sodium carboxymethylhydroxyethyl cellulose, polyvinyl pyrrolidone, poly(alkyl)oxazoline, and film-forming derivatives of polyethylene glycol.
- DETD Polyvinyl alcohol which is preferred is an excellent film forming material, and has good strength and pliability under most conditions. Commercially available polyvinyl alcohol compositions for casting as films vary in molecular weight and degree of hydrolysis. For most film applications, molecular weights in the range of about 10,000 to about 100,000 are preferred. Hydrolysis is the percent by which acetate groups of the polyvinyl alcohol have been substituted with hydroxyl groups. For film applications, the range of hydrolysis typically is about 70% up to 100%. Thus, the term "polyvinyl alcohol" usually includes **polyvinyl acetate** compounds.
- DETD It is also important to select a water soluble film that does not react with the **pellets** 4 contained in the water soluble bag 3 formed therefrom. Other factors which should be considered when choosing a water soluble film to form the water soluble bag 3 include the following: the effect of the water soluble film on equipment including pumps, pipes and nozzles; the effect of the water soluble film on waste water; the toxicity of the water soluble film; the printability of the water soluble film; and properties which allow the water soluble film to be used on automated bag-making equipment (i.e. sealability, tensile strength and tear strength).
- DETD The water soluble bag 3 is filled by pouring the weighed **pelletized** functional material 4 into the previously prepared water soluble bag 3 and finally heat sealing the fourth edge.
- DETD Thus the article 16 comprising the sealed water soluble bag 3 containing the **pelletized** functional composition 4 should be protected from atmospheric humidity. The article 16 can be placed in the moisture impervious outerwrap 2 described further below.
- DETD The water soluble bag 3 can be of whatever dimensions necessary in order to enclose the desired amount of **pelletized** functional composition
- DETD However, as currently envisioned with about 200 to 450 grams as the expected minimum amount of **pelletized** composition that will be enclosed, the expected internal bag dimensions would typically be about

4 to 5 inches wide and about 5 to 7 inches long.

DETD The water soluble bag 3 should have a minimum capacity of about 200 grams to 900 grams for reasons of customer convenience depending upon the nature of the **pellet** 4.

DETD The amount of **pelletized** composition 4 that the water soluble container 3 would contain is dependent to an extent upon the **pelletized** composition and its intended use.

DETD A water soluble container 3 intended for containing a **pelletized** silicate laundry detergent or a **pelletized** laundry softening agent should have a typical capacity of about 450 grams.

DETD A water soluble container 3 intended for containing a **pelletized** silicate warewashing composition or a **pelletized** caustic warewashing composition should have a typical capacity of about 900 grams.

DETD A water soluble container 3 intended for containing a **pelletized** presoak composition, a **pelletized** general purpose composition or a **pelletized** hard surface cleaner should have a typical capacity of about 200 grams.

DETD Whenever a warewashing **pelletized** functional composition 4 is enclosed by the water soluble container 3, the water soluble container typically encloses at least about 900 grams of the **pelletized** functional composition 4.

DETD The water soluble bag 3 should have a maximum capacity of about 3 kg-9 kg for reasons of customer convenience. Preferably, the water soluble bag 3 should have a capacity of about 1 kg-5 kg most preferably about 2-3 kg, depending upon the **pelletized** composition and its intended use.

DETD The water soluble bag containing **pelletized** warewashing composition should have a capacity of about 900 grams - 9 kg for reasons of customer convenience.

DETD A typical water soluble bag 3 containing approximately four pounds of **pelletized** functional material 4 may have overall dimensions of about 8 inches by about 12 inches, with sealed margins of about 1/4 to 1/2 inches.

DETD A typical water soluble bag 3 containing approximately six pounds of **pelletized** functional material 4 may have inside dimensions of about 7 1/2 inches by about 14 inches, with sealed margins of about 1/4-1/2 inches.

DETD **Pelletized** Functional Material

DETD The water soluble bag 3 contains enough **pellets** 4 in order to provide for multiple uses when the water soluble bag 3 is placed in a dispenser 5 and repeatedly contacted with water.

DETD The water soluble bag 3 contains a sufficient amount of **pellets** 4 to provide for at least about 2 uses, preferably about 4 to 20 uses for reasons of customer convenience and most preferably about 8 to 12 uses for reasons of customer convenience. Besides being dependent upon the amount of **pelletized** material, the number of uses is also dependent upon the water temperature, water pressure, **pellet** composition, water flow rate, water soluble bag composition and length of time the **pellets** are contacted with water during each use.

DETD The mass of each **pellet** 4 typically ranges from about 2 to 30 grams, preferably about 5 to 15 grams for reasons of dissolution, and most preferably about 7 to 8 grams for reasons of preferred dissolution rate. If the **pellets** 4 are too large the rate of dissolution will be too low. If the rate of dissolution is too low the solution formed will have too low of a concentration of dissolved functional material. If the **pellets** 4 are too small the rate of dissolution will be too high. If the rate of dissolution is too high the solution formed will have too high of a concentration of dissolved functional material. Typically, the detergent solution is transferred to a washing or cleaning apparatus which has a concentration monitoring device which controls the length of time water is sprayed through the nozzle 11 onto the **pelletized** material 4. If the solution enters at the machine in a highly concentrated form, the concentration could reach too high of a level before the sensor would detect the concentration and shut off the flow of water to the dispenser 5. In

addition, concentrations that are too high could affect product performance.

DETD A **pellet** 4 can have the following dimensions: a width ranging from about 5 to 30 mm, a height ranging from about 10 to 80 mm, and a depth ranging from about 10 to 30 mm. Preferably each **pellet** has about a width of about 19 mm, a height of about 30 mm and a width of about 15 mm for preferred dissolution.

DETD As used herein, the terms "**pellet**" 4, "**pelletized** functional material" 4, and "**pelletized** functional composition" are used interchangeably. The terms also include but are not limited to the following: briquettes, tablets, **pellets**, nuggets, etc.

DETD The shape of the **pellets** 4 used in the water soluble bag 3 of the present invention can vary. The shape of a **pellet** 4 can include any regular geometric shape including but not limited to the following: spherical, pyramidal, cubic, oblate spheroid, prismatic, cylindrical, etc.

DETD Preferably, the **pellets** 4 used in the water soluble bag 3 of the present invention are spheroid shaped for reasons of manufacturing ease.

DETD In order to protect the article 16 of the present invention which comprises a water soluble bag 3 containing a multiple use amount of a **pelletized** functional material 4 during storage, shipping and handling, a water impervious outerwrap 2 can be provided to prevent damage from atmospheric moisture such as high humidity, rain and dew and from accidental contact with water by splashing or wet hands. This water impervious outerwrap 2 can be provided for either an individual article 16 or groups of articles 16, whichever appears to be most desirable for the individual case. Preferably, the water impervious outerwrap 2 is provided individually for each article 16 for reasons of customer safety and convenience and product protection. Once the water impervious outerwrap 2 is removed, the article 16 should either be protected from water contact or promptly inserted into the dispenser 5.

DETD A polyethylene water impervious outerwrap 2 having the following dimensions can be used to enclose a water soluble bag 3 containing 4 lbs. of **pelletized** functional composition 4.

DETD The enclosed **pelletized** functional material 4 is typically used by placing the article 16 inside the dispenser 5 after removing the water impervious outerwrap 2. The water soluble bag 3 of the present invention contains too large of an amount of **pelletized** functional material 4 to be placed directly in a warewashing or cleaning apparatus for a single use cycle.

DETD The perforated grate 6 serves to support the water soluble bag 3 containing the **pellets** 4 within the dispenser 5.

DETD The perforated grate 6 is preferably flat in order to facilitate contact of the water soluble bag 3 and **pellets** 4 with the water being sprayed from below.

DETD The perforated grate 6 contains a number of openings 7. The openings 7 must be of a sufficient size and number to allow an adequate amount of water to spray through the perforated grate 6 in order to dissolve the water soluble bag 3 and the **pellets** 4 contained therein. To facilitate dispensing it is preferable that the perforated grate 6 contain as many openings 7 as possible in order to facilitate contact of water from the nozzle 11 below with the **pellets** 4 and the water soluble bag 3 which are supported by the perforated grate 6. The openings 1 should not be so numerous that the perforated grate 6 is too weak to support the weight of the water soluble bag 3 and **pellets** 4 or to permit the **pellets** to pass through the grate openings.

DETD The openings 7 should be smaller than the **pellets** 4 contained in water soluble bag 3 so that the **pellets** 4 do not fall through the openings 7 in perforated grate 6 as soon as the water soluble bag 3 dissolves.

DETD A safety grate 9 is typically situated below the perforated grate 6. The safety grate 9 serves to collect any subdivided **pellet** 4 particles which have been eroded to a size small enough to fall through

an opening 7 contained in perforated grate 6. The safety grate 9 typically has a size such that a particle comprising about 5 mm.times.5 mm or larger cannot fit through the openings 10 contained in safety grate 9.

DETD The safety grate 9 can comprise a number of materials including but not limited to the following: plastic, metal, and **wire** mesh.

DETD The safety grate 9 prevents **pellet** 4 particles from entering and clogging the line 13 leading from the dispenser 5 to the unit such as a warewashing machine that uses the use solution. Water which has been sprayed through nozzle 11, through perforated grate 6 and onto the water soluble bag 3 and **pellets** 4 supported by perforated grate 6 dissolves the **pellets** 4 resulting in the formation of a use solution. The use solution thus formed flows back down through the perforated grate 6 and safety grate 9 and out of the dispenser 5 through line 13. **Pellet** 4 particles which have fallen onto safety grate 9 are dissolved upon contact with the use solution as it flows out of the dispenser 5.

DETD A nozzle 11 or other fluid dispersing means is typically positioned such that water or other dissolving fluid can be directed onto the water soluble bag 3 and **pellets** 4 resting on the perforated grate 6 in order to form a solution.

DETD The rate of dissolution of the water soluble bag 3 and the **pellets** 4 contained therein is dependant upon a number of factors including the water temperature and the pressure of the water sprayed upon the water soluble bag 3 and the **pellets** 4 contained therein. The higher the water pressure the higher the dissolution rate of the water soluble bag 3 and **pellets** 4. Likewise, the higher the water temperature the higher dissolution rate of the water soluble bag 3 and **pellets** 4. The size of the **pellet** 4 itself also affects the dissolution rate.

DETD The smaller the **pellet** 4 the higher its dissolution rate. Conversely, the larger the **pellet** 4 the lower its dissolution rate.

DETD A **pellet**'s 4 dissolution rate is also affected by whether the **pellet** 4 has been previously wetted. If a **pellet** 4 has been wetted during a pervious solution formation cycle then it will have a higher dissolution rate during subsequent solution formation cycles.

DETD The dissolution rate of a **pellet** 4 is also affected by the **pellet**'s 4 density. The higher the density of a **pellet** 4, the slower it dissolves.

DETD The **pellets** 4 used in the water soluble bag 3 of the present invention can have a density ranging from about 1.0 to 3.0 gm/ml, preferably about 1.7 to 2.0 gm/ml for reasons of dispensing and most preferably 1.8 to 1.9 gm/ml for reasons of friability and dispensing.

DETD A warewashing **pellet** 4 for use in the article 16 of the present invention has a dissolution rate such that it does not completely dissolve in less than about 7-10 minutes when contacted with water having a temperature of the range of water typically used in consumer dishwashers.

DETD The rate of dissolution is also dependent upon the composition of the water soluble bag 3 itself and upon the compositions of the **pellets** 4 contained therein.

DETD Preferably, the **pelletized** functional material is contacted with a water spray having a sufficient temperature and pressure in order to form a concentrate which can be dispensed to its use location within about 0.5-5 minutes. Preferably, the dispensing time necessary in order to achieve the desired concentration of functional material at the use location is less than 3 minutes.

DETD The temperature of the water sprayed through the nozzle 11 onto the article 16 can vary depending upon the composition of the water soluble container 3 and the **pelletized** functional material 4.

DETD Preferably, the water has a minimum temperature of about 34.degree. F. in order to dissolve the water soluble container. The minimum water temperature is also dependent upon the composition of the **pelletized** functional material.

DETD The contact of water with the **pelletized** functional material 4

within the dispenser 5 results in the formation of a solution. Such solution is directed by means of a line 13 into a washtank, bucket or wherever the solution is needed.

DETD An ionic sensor or other concentration monitoring device can be used to determine the concentration of solution formed by action of the water on the **pellets** 4 contained within the dispenser 5. The ionic sensor serves to regulate the length of time water is sprayed through the nozzle 11, thus insuring a high accuracy with regards to the functional material solution concentration.

DETD The dispenser 5 used to dissolve the article 16 of the present invention can be used by itself in order to form a solution from the **pellets** 4 contained in the water soluble bag 3. Alternatively, the dispenser 5 can be mounted directed onto a machine such as a warewashing machine, laundry machine, etc. which the dispenser 5 is being used in conjunction with. Alternatively, the dispenser 5 can be situated on the floor next to the machine it is being used in conjunction with, or mounted on a nearby wall.

DETD **Pelletized Functional Composition**

DETD The article 16 of the present invention can contain a multiple use amount of a **pelletized** functional material 4 including but not limited to a fabric treatment composition, a warewashing composition, a laundry composition, a pot and pan cleaner or presoak composition, a silverware cleaner or presoak composition, a floor cleaner composition, a rinse additive composition, a disinfectant composition, a general purpose cleaner composition, etc. The **pelletized** materials of the invention are room temperature solids. The materials are solidified by a variety of mechanisms, including compressive molding, compressive **pelletizing**, casting, hydration hardening, the use of organic hardening agents, etc.

DETD Formula I comprises a detergent **pellet** whereas Formula II comprises a fabric softening **pellet** which also serves to lower the pH (i.e. acidify or sour) the water in which the **pellet** is dissolved.

DETD

	Narrow	Preferred	Broad
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#### FORMULA I

##### SILICATE LAUNDRY DETERGENT **PELLET**

1.	Alkali metal silicate		
	48-52	30-60	5-90
2.	Alkali metal hydroxide		
	20-50	20-60	0-80
3.	Sequestering agent		
	15-30	10-60	1-90
4.	Antiredeposition agent		
	2-4	2-8	0-10
5.	Dye	0.018-0.022	
		0.005-0.05	
			0-0.5

##### Optional Ingredients

6.	Optical brightener	0.1-1.0	0-5
7.	Nonionic surfactant	20-30	0-50
8.	Anionic surfactant	5-15	0-20
9.	Fragrance	0.05-0.5	
			0-1.0
10.	Sodium carbonate		0-80
11.	Water of hydration		0-30

#### FORMULA II

##### LAUNDRY SOFTENING **PELLET**

1.	Moderate pH acid	70-90	50-100
2.	Quaternary surfactant		
	20-40	10-50	50-100
3.	Optical brightener	0.1-0.4	0-2
4.	Fragrance	0.1-0.5	0-2
5.	Iron control agents	5-15	0-20
6.	Water of hydration		0-43

## 7. Enzyme

0-5

- DETD 1(a). LAUNDRY COMPOSITION--FORMULA I--LAUNDRY DETERGENT **PELLET**
- DETD The laundry detergent **pellet** may comprise about 0 to 100 wt-% of an alkali metal silicate, preferably about 30 to 60 wt-% for reasons of detergency and dispensing ability and most preferably about 48-52 wt-% for reasons of solubility.
- DETD The laundry detergent **pellet** may comprise about 0 to 80 wt-% of a source of an alkali metal hydroxide, preferably about 20 to 60 wt-% for reasons of solubility and detergency and most preferably about 20 to 50 wt-% for reasons of effective cleaning. Suitable alkali metal hydroxides include: potassium hydroxide and sodium hydroxide.
- DETD The laundry detergent **pellet** may comprise about 0 to 100 wt-% of a sequestering agent, preferably about 10 to 60 wt-% for reasons of chelating water hardness and improving soil removal and most preferably about 15 to 30 wt-% for reasons of effective sequestering. Suitable sequestering agents include but are not limited to the following: alkali metal phosphates such as pyrophosphates, tripolyphosphates, sodium aluminosilicates, sodium carbonate, and also organic sequestering agents, such as EDTA, NTA, phosphonates, polyacrylic acid, copolymers of acrylic acid, copolymers of itaconic acid, etc. Preferably the sequestering agent comprises sodium tripolyphosphate for reasons of cost.
- DETD The laundry detergent **pellet** may also comprise about 0-0.5 wt-% of a dye, preferably about 0.005-0.05 wt-%, and most preferably about 0.018-0.022 wt-%.
- DETD The laundry detergent **pellet** may also comprise about 0-10 wt-% of an antiredeposition agent, preferably 2-8 wt-% for reasons of suspending soil and preventing deposition on fabric and most preferably about 2-4 wt-% of an antiredeposition agent for reasons of effective soil suspension. Suitable antiredeposition agents include but are not limited to the following: substituted celluloses such as carboxymethyl cellulose, polyvinyl pyrrolidine, polymeric polycarboxylate materials, and ethoxylated amides. Preferably the antiredeposition agent comprises carboxymethyl cellulose for reasons of efficacy.
- DETD The laundry detergent **pellet** may also comprise about 0-5 wt-% of an optical brightener, preferably about 0.1-1.0 wt-%.
- DETD The laundry detergent **pellet** may also comprise about 0-50 wt-% of a nonionic surfactant, preferably about 10-40 wt-%, and most preferably about 20-30 wt-%. Suitable nonionic surfactants include but are not limited to the following: propoxylated and/or ethoxylated alkyl phenols, propoxylated and/or ethoxylated aliphatic alcohols and carboxylic esters. For reasons of effective detergency, low cost, ease of availability, and low foam, the preferred nonionic surfactants are ethoxylated nonyl phenols having 9-10 moles of ethoxylate and C.sub.12 -C.sub.15 linear alcohols having 7-9 moles of ethoxylate.
- DETD The laundry detergent **pellet** may also comprise about 0-20 wt-% of an anionic surfactant, preferably about 5-15 wt-% for reasons of particulate soil dispersion. Suitable anionic surfactants include but are not limited to the following: linear alkyl benzene sulfonate, alcohol sulfate, alcohol ether sulfate and alpha olefin sulfonates. Preferably the anionic surfactant comprises a linear alkyl benzene sulfonate for reasons of cost and efficacy.
- DETD The laundry detergent **pellet** may also comprise about 0-80 wt-% sodium carbonate.
- DETD The laundry detergent **pellet** may also comprise about 0-1.0 wt-% of a fragrance, preferably about 0.05-0.5 wt-%.
- DETD The laundry detergent **pellet** may also comprise about 0-30 wt-% water of hydration, preferably about 0 to 15 wt-% for reasons of ensuring a strong **pellet** that resists breakage and dusting and concentrating the product actives.
- DETD The following Example demonstrates the good dissolution rate of a water soluble bag of the present invention containing a **pelletized** silicate laundry detergent functional composition. A water soluble bag having the following dimensions: 7 1/2 inches length, 10 inches width and

a thickness of 1.5 mils and comprising a polyvinyl alcohol film bag purchased from Chris Craft Industries, Inc. having the properties set forth in Table A containing 3 lbs. of **pellets** is inserted into a dispenser. The silicate laundry detergent **pellets** have the following composition:

DETD The water soluble bag containing the **pellets** is contacted with water having a temperature of 135-155.degree. F. in order to form a solution. The solution is formed and transferred to a 30 gallon tank containing 25 gallons of fresh water. By means of an ionic sensor it is determined that it takes less than about 3 minutes for the tank to reach the desired concentration.

DETD 1(b). LAUNDRY COMPOSITION--FORMULA II--LAUNDRY SOFTENING **PELLET**

DETD Formula II comprises a laundry softening **pellet**.

DETD The laundry softening **pellet** can comprise about 50-100 wt-% of a moderate pH acid, preferably about 70-90 wt-% for reasons of reducing linen pH to prevent skin irritation and enhance rinsing of water hardness salts. Suitable moderate pH acids include but are not limited to the following: ammonium silico fluoride, sodium silicofluoride, tartaric acid, citric acid, oxalic acid, sodium acid fluoride and ammonium acid fluoride. Preferably the moderate pH acid comprises ammonium silico fluoride for reasons of solubility, toxicity and cost.

DETD The laundry softening **pellet** also comprises about 50-100 wt-%, preferably about 10-50 wt-%, and most preferably about 20-40 wt-% of a quaternary surfactant.

DETD The laundry softening **pellet** may also comprise about 0-2 wt-% of an optical brightener, preferably about 0.1-0.4 wt-%.

DETD The laundry softening **pellet** may also comprise about 0-2 wt-% of a fragrance, preferably about 0.1-0.5 wt-%.

DETD The laundry softening **pellet** may also comprise about 0-20 wt-% of an iron control agent, preferably about 5-15 wt-% for reasons of reducing yellowing caused by iron deposits. Suitable iron control agents include but are not limited to the following: oxalic acid, citric acid, such as HEDP (hydroxyethylene diphosphonic acid), sodium or ammonium acid fluoride and organic amino polycarboxylated compounds such as nitrilotriacetic acid and ethylene diamine diacetic acid.

DETD The laundry softening **pellet** may also comprise about 0-43 wt-% water of hydration, preferably about 0-15 wt-% for reasons of reducing the percentage of inactive materials in the formulation.

DETD The laundry softening **pellet** may also comprise about 0-5 wt-% of an enzyme, preferably about 1-4 wt-% for reasons of protein and starch stain removal. Suitable enzymes include but are not limited to the following: amylase, protease, lipase and cellulase.

DETD The following Example demonstrates the good dissolution rate of a water soluble bag of the present invention containing a laundry softening **pelletized** functional composition. A water soluble bag having the following dimensions: 7 1/2 inches length, 6 inches width and a thickness of 1.5 mils and comprising a polyvinyl alcohol film bag purchased from Chris Craft Industries, Inc. having the properties set forth in Table A containing 1 lb. of **pellets** is inserted into a dispenser.

DETD The laundry softening **pellet** composition is as follows:

DETD The water soluble bag containing the **pellets** is contacted with water having a temperature of 135-155.degree. F. in order to form a solution. The solution is transferred to a 30 gallon tank containing 25 gallons of fresh water. By means of an ionic sensor it is determined that it takes less than 3 minutes for the tank to reach the desired concentration.

DETD We believe that a multiple use amount of a **pelletized** warewashing composition may be used in the water soluble bag of the present invention.

DETD The **pelletized** metasilicate based warewashing composition of this invention preferably comprises about 10 to 70 wt-%, of a sequestering agent, preferably about 30 to 40 wt-% for reasons of effective sequestering of hardness ions.

DETD The **pelletized** metasilicate based warewashing composition of this invention can comprise about 10 to 70 wt-% of an alkali metal

silicate. Preferably the **pelletized** warewashing composition comprises about 30 to 60 wt-% of an alkali metal silicate for reasons of supplying alkalinity, and most preferably about 40 wt-% of an alkali metal metasilicate for reasons of supplying sufficient alkalinity.

DETD Methods of manufacturing alkali metal silicates having various x:y mole ratios are well known as demonstrated by the general disclosure in the Kirk-Othmer Encyclopedia of Chemical Technology, 2d Ed., Vol. 18, pp. 139-141. The desired properties and benefits of the **pelletized** warewashing composition described herein can be obtained using an alkali metal silicate having an x:y ratio of about 1:1-3:1, preferably 1:1. At these ratios, the alkali metal silicate has sufficient alkaline character to clean effectively and sufficient silicon dioxide to protect aluminum, china, glassware, etc. from the etchant effect of basic components in the composition.

DETD The **pelletized** metasilicate based warewashing composition of this invention can comprise about 0 to 10 wt-% of a secondary sequestering agent. Preferably, the **pelletized** warewashing composition comprises about 0 to 4 wt-% of an secondary sequestering agent for reasons of better product performance.

DETD The **pelletized** metasilicate based warewashing composition of the present invention can also comprise about 0 to 60 wt-% of a filler. Preferably the **pelletized** warewashing composition comprises about 0-40 wt-% of a filler for reasons of cost, and most preferably about 18-22 wt-% for reason of cost.

DETD Suitable fillers include but are not limited to the following: sodium carbonate, and **sodium sulfate**.

DETD The more fillers the **pellet** contains, the less expensive the **pellet**. Preferably, the filler comprises sodium carbonate for economic reasons and the fact that sodium carbonate services as an additional source of alkalinity.

DETD The **pelletized** metasilicate based warewashing composition may also comprise about 0.1-10 wt-% of a bleaching source. Preferably the **pelletized** warewashing composition contains about 1-6 wt-% of a bleaching source, for reasons of detaining, and most preferably about 2-3 wt-% for reasons of cost coupled with good destaining.

DETD Bleaches suitable for use in the **pelletized** warewashing composition include any of the well known bleaching agents capable of removing stains from such substrates as dishes, flatware, pots and pans, textiles, countertops, appliances, flooring, etc. without significantly damaging the substrate. A nonlimiting list of such bleaches include bleaches such as hypochlorites, chlorites, chlorinated phosphates, chloroisocyanates, chloroamines, etc.; and peroxide compounds such as hydrogen peroxide, perborates, percarbonates etc. Preferred bleaches include those bleaches which liberate an active halogen species such as Cl.sup.+ , Br.sup.+ , OCl.sup.- , or OBr.sup.- under conditions normally encountered in typical cleaning processes. Most preferably, the bleaching agent releases Cl.sup.+ or OCl.sup.-. A nonlimiting list of useful chlorine releasing bleaches includes calcium hypochlorite, lithium hypochlorite, chlorinated trisodium phosphate, sodium dichloroisocyanurate, potassium dichloroisocyanurate, pentaisocyanurate, trichloromelamine, sulfondichloro-amide, 1,3-dichloro-5,5-dimethyl hydantoin, n-chlorosuccinimide, n,n'-dichloroazodicarbonimide, n,n'-chloroacetyl urea, n,n'-dichlorobiuret, trichlorocyanuric acid, and hydrates thereof.

DETD The **pelletized** metasilicate based warewashing composition of the present invention may also comprise about 0-10 wt-% of a defoaming surfactant.

DETD The **pelletized** warewashing composition may also further comprise 0-10 wt-% a dye and 0-10 wt-% fragrance.

DETD The **pelletized** functional composition of the present invention can be manufactured by a number of processes, included but not limiting to the following: a batch process and a continuous process.

DETD In the batch process, sodium metasilicate, low density tripolyphosphate, surfactant, soda ash, and dry polyacrylate are added in any order to a ribbon blender or a Nauta mixer. The last item added is the chlorine source (sodium dichloroisocyanurate dihydrate). The various dry

ingredients are mixed for 5-10 minutes, collected in drums and fed through a belt feeder to the **pelletizer**.

DETD The premixed product is fed to a model 25C59 **pelletizer** manufactured by Strong-Scott which is equipped with a double roll and a vertical screw. The screw serves to force the premixed product between the rolls. The rolls rotate at about 15 r.p.m. and form **pellets** at a rate of 1,000 pounds of **pellets** per hour. The hydraulic pressure is set at 2,200 psig. **Pellets** formed at the **pelletizer** drop onto a 3 foot diameter screener equipped with a 1/2 inch mesh screen. The screen serves to deburr the **pellets**. Fines are recycled back to the ribbon blender or Nauta mixer. The finished **pellet** product is collected and packaged.

DETD The following Example demonstrates the good dissolution rate of **pellets** prepared according to this invention. 5 lbs. of metasilicate based warewashing **pellets** having the following composition:

DETD The following Example demonstrates the good dissolution rate of a water soluble bag of the present invention containing a **pelletized** functional composition. A water soluble bag having the following dimensions: 14 inches length, 7 1/2 inches width and a thickness of 1.5 mils and comprising a polyvinyl alcohol film bag purchased from Chris Craft Industries, Inc. having the properties set forth in Table A and containing 5 lbs. of **pellets** was inserted into a dispenser. The **pellets** had the same composition as the **pellets** disclosed in Example 3. The water soluble bag containing the **pellets** was contacted with water having a temperature of 135.degree.-155.degree. F. in order to form a solution. The solution thus formed was transferred to a 30 gallon tank containing 25 gallons of fresh water. By means of an ionic sensor it was determined that it took only 3 minutes and 7 seconds for the tank to reach the desired concentration.

DETD The following test data demonstrates the superior performance exhibited by our metasilicate based warewashing **pellets** contained in a water soluble bag when compared with powdered warewashing detergents.

DETD For the next two or three months, our article comprising a water soluble container containing **pelletized** warewashing composition was utilized in the dispensers in place of the powdered detergents.

DETD It was determined that the warewashing results obtained from use of our invention were equal to the results obtained by use of the powdered compositions, even though a lower usage of our **pelletized** products was used as compared to the powdered products.

DETD Our metasilicate based warewashing **pellets** which were tested, **Pellet A** and **Pellet B**, had the following formulas:

DETD The **Pellet A pellets** had the formula set forth in Example 3.

DETD The **Pellet B pellets** had the following formula:

DETD Five pounds of **Pellet B pellets** were contained in a water soluble bag having the properties of the water soluble bag described in Example 4.

DETD Five pounds of **Pellet A pellets** were contained in a water soluble bag as described in Example 4.

DETD The three powdered products, which we tested our article containing **Pellet A** and our article containing **Pellet B pellets** against, had the following, formulas:

DETD  
Wt-%                      Ingredient

---

Powdered Product I

18.0	sodium tripolyphosphate
48.8	sodium carbonate
2.6	sodium polyacrylate
29.0	sodium metasilicate
1.6	sodium dichloroisocyanurate dihydrate

Powdered Product II

4.2	sodium carbonate
1.5	sodium polyacrylate

1.8	sodium dichloroisocyanurate dihydrate
8.8	sodium chloride
1.0	alkyl phosphate ester
22.4	sodium hydroxide
22.5	sodium tripolyphosphate
Powdered Competitor Product III	
14.3	sodium tripolyphosphate
35.7	sodium carbonate
1.0	sodium polyacrylate
1.0	sodium dichloroisocyanurate dihydrate
22.0	sodium chloride
1.0	alkyl phosphate ester
25.0	sodium hydroxide

Test No.	Average usage of pellet product to obtain equal results	Average usage of powdered product to obtain equal results	Number of Tests
1.	Pellet A - 0.16	0.23 Product II	7
2.	Pellet B - 0.127	0.192 Product I	4
3.	Pellet A - 0.17	0.22 Product III	6
4.	Pellet B - 0.134	0.187 Product II	4
5.	Pellet B - 0.13	0.2 Product II	5
6.	Pellet B - 0.115	0.145 Product III	5

DETD As the data above demonstrates in each test a larger usage of the powder products has to be utilized in order to achieve a result equal to that obtained with a smaller usage of our articles containing

**pelletized** functional composition.

DETD The following table sets forth the formula and preparation procedure for a caustic warewashing **pellet** 4 which could be used in the water soluble bag 3 of the present invention.

DETD The caustic warewashing **pellet** may comprise about 15-70 wt-% of an alkali metal hydroxide, preferably 25-50 wt-%, and most preferably 40 wt-% for reasons of cleaning performance. Suitable alkali metal hydroxides include but are not limited to the following: potassium hydroxide, sodium hydroxide, or mixtures of potassium and sodium hydroxide.

DETD The caustic warewashing **pellet** may comprise about 10-50 wt-% of an inorganic sequestering agent, preferably about 25-45 wt-% for reasons of hard water control, and most preferably about 35 wt-% for reasons of economy and legal restrictions on phosphorous content. Suitable inorganic sequestering agents include but are not limited to the following: tetrasodium pyrophosphate, tetrapotassium pyrophosphate, sodium tripolyphosphate, potassium tripolyphosphate. The preferred inorganic sequestering agent is sodium tripolyphosphate, for reasons of availability and economy of use.

DETD The caustic warewashing **pellet** may comprise about 0-8 wt-% of

a bleaching source, preferably about 2-6 wt-% for reasons of economy, and most preferably about 5 wt-% for reasons of cost effectiveness. Suitable bleaching sources include but are not limited to the following: calcium hypochlorite, lithium hypochlorite, chlorinated trisodium phosphate, sodium dichloroisocyanurate dihydrate, potassium dichloroisocyanurate dihydrate, sodium dichloroisocyanurate, and potassium dichloroisocyanurate. Preferably, the bleaching source comprises sodium dichloroisocyanurate dihydrate for reasons of availability and economy.

- DETD The caustic warewashing **pellet** may comprise about 0-40 wt-% of a filler, preferably 10-30 wt-%, and most preferably about 15 wt-% for reasons of cost effectiveness. Suitable fillers include but are not limited to the following: sodium carbonate, sodium silicate, sodium metasilicate, sodium borate, and sodium chloride. Sodium carbonate is the preferred filler for reasons of cost effectiveness and that it provides an additional source of alkalinity.
- DETD The caustic warewashing **pellet** may also comprise about 0-7 wt-% of an organic sequestering agent, preferably about 2-5 wt-% for reasons of economy, and most preferably about 3 wt-% for reasons of cost effectiveness.
- DETD The caustic warewashing **pellet** may comprise about 0-5 wt-% of a defoaming surfactant, preferably about 1-3 wt-% for reasons of performance, and most preferably about 2 wt-% for reasons of cost effectiveness.
- DETD To form the caustic warewashing **pellets** of the present invention all ingredients can be dry blended in an appropriate mixer such as a ribbon mixer in order to form a uniform mixture. This mixture is then **pelletized** to form **pellets** having a mass of about 5 to 15 grams using a **pelletizing** machine.
- DETD The following Example demonstrates the good dissolution rate of a water soluble bag of the present invention containing a caustic warewashing **pelletized** functional composition. A water soluble bag having the following dimensions: 12 inches length, 7 1/2 inches width and a thickness of 1.5 mils and comprising a polyvinyl alcohol film bag purchased from Chris Craft Industries, Inc. having the properties set forth in Table A containing 5 lbs. of **pellets** is inserted into a dispenser.
- DETD The caustic based warewashing **pellet** composition:
- DETD The water soluble bag containing the **pellets** is contacted with water having a temperature of 135.degree.-155.degree. F. in order to form a solution. The solution formed is transferred to a 30 gallon tank containing 25 gallons of fresh water. By means of an ionic sensor it is determined that it took less than 3 minutes for the tank to reach the desired concentration.
- DETD The **pelletized** functional composition of the present invention may also comprise a presoak composition.
- DETD Various **pelletized** presoak compositions may be used in the water soluble bag of the present invention. An example of a **pelletized** silverware presoak and detarnisher composition which could be used in the water soluble bag of the present invention is the following:

DETD

#### **Pelletized Presoak Composition**

Raw Material	Wt-% Most Preferred	Wt-% Broad	Wt-% Preferred
1. Sequestering agent	24	10-34	20-30
2. Conductive filler	62.74	10-70	50-70
3. Nonionic surfactant	3.00	1-5	2-4
4. Anionic surfactant	3.00	1-5	2-4
5. Water	6.00	1-30	1-10

6. Enzyme	1.0	0.01-5.0 0.5-2.0
7. Dye	0.06	0-0.10 0.05-0.07
8. Fragrance	0.20	0-0.5 0.05-0.3

- DETD The **pelletized** presoak composition may comprise about 10-34 wt-% of a builder or a sequestering agent. Preferably the **pelletized** presoak composition contains about 20-30 wt-% of a builder or sequestering agent and most preferably about 24 wt-%. Suitable builders or sequestering agents include but are not limited to the following: sodium tripolyphosphate, EDTA (ethylene diamine tetra acetic acid), tetrasodium pyrophosphate, zeolites, citric acid, polyacrylates, NTA (nitrilotriacetic acid), and sodium carbonate. Preferably the builder or sequestering agent comprises sodium tripolyphosphate for reasons of water hardness control and cost.
- DETD The **pelletized** presoak composition may also comprise about 10-70 wt-% of a conductive filler, preferably about 50-70 wt-% for reasons of cost and dispensing control and most preferably about 62.74 wt-% for reasons of cost and dispensing control. The conductive filler serves to increase the conductivity of the water which is necessary in order to detarnish silverware. Suitable conductive fillers include but are not limited to the following: soda ash, **sodium sulfate**, sodium chloride, borax, sodium bicarbonate and sodium sesquicarbonate. Preferably the conductive filler comprises soda ash for reasons of cost, processing and dispensing control.
- DETD The **pelletized** presoak composition may also comprise about 1-5 wt-% of a nonionic surfactant, preferably about 2-4 wt-% for reasons of wetting, and most preferably about 3 wt-% of a nonionic surfactant for reasons of wetting.
- DETD The **pelletized** presoak composition may also comprise about 1 to 5 wt-% of an anionic surfactant, preferably about 2 to 4 wt-%, for reasons of wetting, and most preferably about 3 wt-% for reasons of wetting. Suitable anionic surfactants include but are not limited to the following: sulframin, alphaolefinsulfonate, **sodium lauryl sulfate**. Preferably, the anionic surfactant comprises sulframin for reasons of optimum wetting.
- DETD The **pelletized** presoak composition may also comprise about 0.01 to 5.0 wt-% of an enzyme, preferably about 0.5 to 2.0 wt-% for reasons of soil removal and most preferably about 1.0 wt-% of an enzyme for reasons of soil removal. Suitable enzymes include but are not limited to the following: esperase, amylase, lipase, and combinations thereof. Esperase serves to break down protein, whereas amylase breaks down starch and lipase breaks down fats. If three enzymes are utilized in the presoak composition, the broad range for each enzyme would range from between about 0.1 to 5.0 wt-%. Thus, the presoak can comprise up to 15 wt-% enzyme if three different enzymes are utilized.
- DETD The **pelletized** presoak composition may also comprise about 1-30 wt-% water, preferably about 1-10 wt-% for reasons of dispensing control and cost, and most preferably about 6.0 wt-% water for reasons of dispensing control and cost. Water helps aid in the **pelletization** process and also acts as a filler.
- DETD The **pelletized** presoak composition may also comprise about 0 to 0.10 wt-% of a dye, preferably about 0.05 to 0.07 wt-% for reasons of aesthetics, and most preferably about 0.06 wt-% for reasons of aesthetics. Suitable dyes include any dye stable at pH's of above 10.
- DETD The **pelletized** presoak composition may also comprise about 0 to 0.5 wt-% of a fragrance, preferably about 0.05 to 3 wt-%, for reasons of aesthetics, and most preferably about 0.20 wt-% for reasons of aesthetics. Suitable fragrances include any that are compatible in the overall system.
- DETD The **pelletized** presoak composition can be formed by either batch or continuous processing. The **pelletized** presoak composition can be manufactured according to the following procedure.
- DETD Presoak **Pellet** Preparation

- DETD The **pelletized** presoak composition can be formed by either batch or continuous processing. The following is an example of a batch production process. 25 wt-% of a dry, powdered or **granular** sequestering agent or builder (sodium tripolyphosphate) is charged to a 100 lb. mix tank and agitation is begun. A dye is then dissolved in 4 wt-% water and sprayed onto the sodium tripolyphosphate while agitation continues until a uniform color is achieved.
- DETD The premixed product is fed to a Model 25CS9 **pelletizer** manufactured by Strong-Scott which is equipped with a double roll and a vertical screw. The screw serves to force the premixed product between the rolls. The rolls rotate at about 15 r.p.m. and form **pellets** at a rate of about 1,000 lbs. of **pellets** per hour. The hydraulic pressure is set at 2,200 psig. **Pellets** formed at the **pelletizer** drop onto a 3' diameter screener equipped with a 1/2" mesh screen. The screen serves to deburr the **pellets**. Fines are recycled back to the mixer. The finished **pellet** product is collected and packaged.
- DETD The following Example demonstrates the good dissolution rate of a water soluble bag of the present invention containing a **pelletized** presoak functional composition. A water soluble bag having the following dimensions: 14 inches length, 7 1/2 inches width and a thickness of 1.5 mils and comprising a polyvinyl alcohol film bag purchased from Chris Craft Industries, Inc. having the properties set forth in Table A containing 5 lbs. of **pellets** is inserted into a dispenser.
- DETD The water soluble bag containing the **pellets** is contacted with water having a temperature of 135.degree.-155.degree. F. in order to form a solution. The solution formed is transferred to a 30 gallon tank containing 25 gallons of fresh water. By means of an ionic sensor it is determined that it took less than 3 minutes for the tank to reach the desired concentration.
- DETD 4. GENERAL PURPOSE FLOOR AND WALL CLEANER AND MANUAL DISHWASHING  
**PELLET**
- DETD The following general purpose floor and wall cleaner and manual dishwashing **pellet** can be used in the water soluble bag of the present invention.
- DETD The general purpose **pellet** can comprise about 0-85 wt-% of a filler. Suitable fillers include but are not limited to the following: **sodium sulfate**, sodium chloride, and other neutral soluble salts. Preferably the filler is **sodium sulfate** for reasons of minimizing corrosion to soft metals.
- DETD The general purpose **pellet** can comprise about 5-70 wt-% of an anionic surfactant, preferably about 5-35 wt-% for reasons of cost and performance. Suitable anionic surfactants include but are not limited to the following: linear dodecyl benzene sulfonate, alcohol ethoxy sulfates, alkano sulfonates, alkali and alkaline earth salts. A high concentration of anionic surfactant results in a **pellet** which can be **pelletized** easier and also a **pellet** which performs better when dissolved in water. However, a low concentration of anionic surfactant results in a **pellet** that is more inexpensive.
- DETD The general purpose **pellet** comprises can comprise about 0-30 wt-% of a nonionic surfactant. Preferably the nonionic surfactant is included in an amount such that about 1 part nonionic surfactant is included for about every 2 parts of anionic surfactant. Suitable nonionic surfactants include but are not limited to the following: fatty acid amides, ethylene oxide, and/or propylene oxide adducts of alcohols.
- DETD The general purpose **pellet** may also comprise about 0 to 5 wt-% of a corrosion inhibitor such as a low alkaline silicate such as sodium silicate or potassium silicate, preferably sodium silicate. Preferably the ratio of M.sub.2 O:SiO.sub.2 is less than about 1:1.
- DETD The general purpose **pellets** are formed by conventional high-pressure **pellet** production methods. Such methods involve combining **granular** or powdered **anhydrous** materials, mixing them to form a premixed product and then transferring the premixed product to a **pelletizer**.
- DETD The following Example demonstrates the good dissolution rate of a water

soluble bag of the present invention containing a **pelletized** general purpose functional composition. A water soluble bag having the following dimensions: 12 inches length, 7 1/2 inches width and a thickness of 1.5 mils and comprising a polyvinyl alcohol film bag purchased from Chris Craft Industries, Inc. having the properties set forth in Table A containing 4 lbs. of **pellets** was inserted into a dispenser.

DETD The **pellets** had the following composition:

DETD

Ingredients	Wt %
1. Sodium sulfate	82.4
2. Linear dodecyl benzene sulfonate	14.7
3. Low alkaline sodium silicate	1.0
4. Dye	.0075
5. Diatomaceous Earth - (flow agent)	1.0
6. Emollient	.3925
7. Sodium polyacrylate	.5

DETD The water soluble bag containing the **pellets** was contacted with water having a temperature of 135.degree.-155.degree. F. in order to form a solution. The solution thus formed was transferred to a 30 gallon tank containing 25 gallons of fresh water. By means of an ionic sensor it was determined that it took less than 3 minutes and 10 seconds for the tank to reach the desired concentration.

DETD 5. HARD SURFACE CLEANER **PELLET**

DETD The following **pelletized** hard surface cleaner can be used in the water soluble bag of the present invention.

DETD The **pelletized** hard surface can comprise about 12.0-8.0 wt-% of a buffering agent, preferably about 15.0 suitable buffering agents include but are not limited to the following: sodium bicarbonate, mixtures of sodium bicarbonate and sodium carbonate, disodium phosphate, trisodium phosphate, monosodium phosphate, mixtures of disodium phosphate and trisodium phosphate, borates such as sodium tetra borate and borax, and combinations of carbonates and phosphates. Suitable combinations of carbonates and phosphates have a weight ratio about 1:1 resulting in a pH of about 9-10.

DETD The **pelletized** hard surface cleaner can comprise about 8.0-12.0 wt-% of an alkalinity and ammonium source, preferably about 10.0 wt-%. Suitable sources include but are not limited to the following: ammonium bicarbonate, ammonium phosphate, diammonium phosphate, a mixture of ammonium chloride and sodium carbonate and other sources capable of forming ammonium ions in solution.

DETD The composition can also comprise about 12.0-18.0 wt-% of an inorganic sequestering agent preferably about 15.0 wt-%. Suitable sequestering agents include but are not limited to those set forth as being suitable for use in the laundry detergent **pellet**.

DETD Preferably the sequestering agent comprises a low density sodium tripolyphosphate bead. A bead is preferred over a powder in that it can be crushed which results in a stronger nonfriable **pellet**.

DETD The **pelletized** hard surface cleaner can also comprise about 22.0-28.0 wt-% of an anionic surfactant, preferably about 25 wt-%. Suitable anionic surfactants include but are not limited to the following: sodium dodecyl benzene sulfonate, **sodium lauryl sulfate** and other anionic surfactants which result in a **pellet** that is non pasty.

DETD The **pelletized** hard surface cleaner can also comprise about 22.0-28.0 wt-% of a nonionic surfactant preferably about 15.0 wt-%. Such nonionic surfactants should be high foaming. Suitable nonionic surfactants include but are not limited to the following: fatty alcohol ethoxylates which are the reaction products of alkyl phenols such as nonyl phenol and octyl phenol with ethylene oxide.

- DETD The **pelletized** hard surface cleaner can also comprise about 8.0-12.0 wt-% of an organic sequestering agent, preferably about 10.0 wt-%.
- DETD The following Example demonstrates the good dissolution rate of a water soluble bag of the present invention containing a **pelletized** hard surface cleaner functional composition. A water soluble bag having the following dimensions: 14 inches length, 7 1/2 inches width and a thickness of 1.5 mils and comprising a polyvinyl alcohol film bag purchased from Chris Craft Industries, Inc. having the properties set forth in Table A containing 5 lbs. of **pellets** 13 are inserted into a dispenser.
- DETD The water soluble bag containing the **pellets** is contacted with water having a temperatures of 135.degree.-155.degree. F. in order to form a solution. The solution formed is transferred to a 30 gallon tank containing 25 gallons of fresh water. By means of an ionic sensor it is determined that it takes less than 3 minutes for the tank to reach the desired concentration.
- CLM What is claimed is:
1. A method of dispensing multiple volumes of an aqueous solution of a wash chemical from a dispenser comprising the steps of: (a) depositing a sealed water soluble article containing a wash chemical into said dispenser; (b) repeatedly directing water onto an article contained in said dispenser in response to a concentration monitoring device in order to form a concentrate; and (c) repeatedly directing said concentrate to a use location wherein said article comprises (i) a sealed water soluble container made of a flexible film, and (ii) a multiple use amount of a **pelletized** water soluble or dispersible was chemical comprising a silicate, an alkaline metal hydroxide or mixtures thereof contained within said sealed water soluble container made of a flexible film.
  4. The method of claim 1 wherein the water soluble container comprises a water soluble polymer selected from the group consisting of a polyvinyl alcohol, **polyvinyl acetate**, polyvinyl pyrrolidine or mixtures thereof.
  5. The method of claim 1 wherein the water soluble container contains at least about 900 grams of **pelletized** functional material.
  6. The method of claim 1 wherein the water soluble container contains about 200 grams to 9 kg of a **pelletized** functional material.
  7. The method of claim 1 wherein each **pellet** has a mass of about 2 to 30 grams.
  8. The article of claim 1 wherein each **pellet** has a width ranging from about 5 to 30 mm., a height ranging from about 10 to 80 mm., and a depth ranging rom about 10 to 30 mm.
  9. The method of claim 1 wherein the sealed water soluble container contains at least about 200 grams of **pelletized** water soluble or dispersible functional composition.
  15. A method for delivering an aqueous alkaline wash chemical, the method comprising: (a) removing a water impervious outerwrap from an article comprising: (i) the water impervious outerwrap; (ii) a container comprising a sealed, water-soluble film; and (iii) a multiple use amount of a **pelletized**, water soluble or dispersible wash chemical comprising a silicate, an alkali metal hydroxide or mixtures thereof contained within the container; (b) placing the article from which the outerwrap has been removed into a dispensing device; (c) directing water onto the article contained within the dispenser to open and to dissolve the film and to form a supply of an alkaline wash concentrate; and (d) directing the supply of alkaline wash concentrate from the dispenser.
  16. The method of claim 15 wherein the water-soluble film comprises a water-soluble polymer selected from the group consisting of polyvinyl

alcohol, **polyvinyl acetate** or mixtures thereof.

17. The method of claim 15 wherein the container contains at least about 200 grams of the **pelletized** wash chemical.

18. A method for delivering an aqueous alkaline wash chemical, the method comprising: (a) selecting an article comprising: (i) a moisture impervious barrier material; (ii) a container comprising a sealed, water-soluble film; and (iii) a multiple use amount of a **pelletized**, water soluble or dispersible wash chemical comprising a silicate, an alkali metal hydroxide or mixtures thereof contained within the container wherein the moisture impervious barrier material sealingly isolates the container from atmospheric moisture; (b) removing the moisture impervious barrier material from the container; (c) placing the article into a dispensing device; (d) directing water onto the article contained within the dispenser to open and to dissolve the film and to form a supply of an alkaline wash concentrate; and (e) directing the supply of alkaline wash concentrate from the dispenser.

IT 9002-89-5, Poly(vinyl alcohol) **9003-20-7**, Poly(vinyl acetate)  
9003-39-8, Poly(vinylpyrrolidone)  
(containers, water-sol., for dispensing of detergent compns.)  
IT **9003-20-7**, Poly(vinyl acetate)  
(containers, water-sol., for dispensing of detergent compns.)  
RN 9003-20-7 USPATFULL  
CN Acetic acid ethenyl ester, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 108-05-4

CMF C4 H6 O2

AcO-CH=CH<sub>2</sub>

L71 ANSWER 5 OF 8 USPATFULL  
AN 91:48455 USPATFULL  
TI Annealed coats  
IN Edgren, David E., El Granada, CA, United States  
Theeuwes, Felix, Los Altos, CA, United States  
PA ALZA Corporation, Palo Alto, CA, United States (U.S. corporation)  
PI US 5024842 19910618  
AI US 1990-503004 19900402 (7)  
DCD 20070605  
RLI Continuation-in-part of Ser. No. US 1988-187621, filed on 28 Apr 1988, now patented, Pat. No. US 4931285  
DT Utility  
EXNAM Primary Examiner: Page, Thurman K.; Assistant Examiner: Horne, L.  
LREP Sabatine, Paul L.; Mandell, Edward L.; Stone, Steven F.  
CLMN Number of Claims: 2  
ECL Exemplary Claim: 1  
DRWN 8 Drawing Figure(s); 2 Drawing Page(s)  
LN.CNT 736  
CAS INDEXING IS AVAILABLE FOR THIS PATENT.  
AB A dosage form is disclosed comprising a coat that surrounds a drug. The coat comprises a subcoat and an overcoat thermally annealed to provide a single unit coat around the drug.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

DETD The subcoating additionally comprises in a preferred embodiment a non-toxic plasticizer or blends of plasticizers. The plasticizers presently preferred are high-boiling softening agents, which are often liquids, pastes, or waxes at room temperature, that are added to the subcoat composition to facilitate processing, and to increase

flexibility and toughness. The plasticizers generally comprise, in a presently preferred embodiment, a member selected from the group consisting of monoglycerides, diglycerides, triglycerides, alkyl phthalyl alkyl glycolates, trialkyl esters of acyl citric acid, dialkyl adipates, dialkyl phthalates, dialkyl sebacates, fatty acid ester derivatives, alkyl-aryl phosphates, fatty acid esters of polysaccharides, triethyl citrate, acetyltriethylcitrate, diethyl phthalate, diethyl tartrate, dibutyl phthalate, dibutyl sebacate, dibutyl tartrate, dibutyl maleate, dibutyl succinate, diethyl succinate, propylene glycol, glycerin, monoacetin, diacetin, triacetin, polyethylene glycol, di-(methoxyethyl) phthalate, methyl and ethyl phthalate ethyl glycolate, butyl phthalyl butyl glycolate, benzyl phthalate, ethylene glycol diacetate, methylglycol phthalate, ethylene glycol monoacetate, trimethyl phosphate, triethyl phosphate, dioctyl adipate, dioctyl phthalate, dibutyloxyethyl phthalate, epoxidized natural glyceride of unsaturated fatty acids, soybean oil epoxide, di-n-hexyl azelate, dimethyl phthalate, diphenyl phthalate butyl stearate, diethyl oxalate, di-isodecyl adipate, dicyclohexyl phthalate, di(2-ethylhexyl) adipate, cresyldiphenyl phosphate, tributyl citrate, acetyl tributyl citrate, trimethyl citrate, acetyltri-n-hexyl citrate, n-butyryltri-n-hexyl citrate, tricyclohexyl citrate, acetyltri-n-(hexyl/octyl/decyl) citrate, acetyltri-n-(octyl/decyl) citrate, tri-n-(decyl/dodecyl) citrate, tristearyl citrate, stearyl citrate-mono, methyl glycol stearate, butyl phthalyl butyl glycolate, triethylphosphate, tri(n-octyl/n-decyl) trimellitate, triisodecyl trimellitate, tri-n-hexyl trimellitate, di(2-ethylhexyl) isophthalate, butyl ricinoleate, polymeric plasticizer acetylated, citric acid esters, natural oils, refined oils, and derivatives of natural oils, fish oils, **shark** liver oil, menhaden oil, orange roughy oil, mink oil, lard oils, vegetable oils, babassu oil, canola oil, castor oil, anise oil, almond oil, apricot kernel oil, avocado oil, wheatgerm oil, coconut oil, cottonseed oil, corn oil, linseed oil, olive oil, palm oil, peanut oil, safflower oil, sesame oil, soybean oil, tall oil, acetyl tri-2-ethylhexyl citrate, linoleic acid, oleic acid, oleyl alcohol, butyl stearate, benzyl benzoate, polysiloxanes, silicone oils, mineral oils, hydrogenated oils, methyl ester of rosin, stearic acid, cetyl alcohol, acetylated glycerides, glycerol esters, lecithin, polyethylene glycol, and the like. The amount of plasticizing agent in a final subcoat on a drug delivery dosage form is about 2% to 75%.

DETD The subcoat comprises also an emulsifying agent or blends of emulsifying agents. The emulsifying agents generally are surface active agents comprising anionic, polar, nonpolar, nonionic, amphoteric, zwitterionic and cationic active emulsifying agents. The amount of emulsifying agents in an aqueous coating composition usually is about 0.1% to 20%, and more preferably about 0.01% to 4%, by weight, of water in the aqueous phase. Representatives of general classes of emulsifying agents comprise a member selected from the group consisting essentially of alkanolmides, alkyl sulfonates, amines and amides sulfonated, betaine emulsifiers, diphenyl sulfonates, ethoxylated alcohols, ethoxylated alkyl phenols, ethoxylated amines, ethoxylated amides, ethoxylated fatty acids and oils, fatty esters, fluorocarbons, glycerol esters glycol esters, heterocyclic emulsifiers, isethionates, lanolin based emulsifiers, lecithin based emulsifiers, phospholipids, lignin emulsifiers, monoglycerides, olefin sulfonates, phosphate emulsifiers, phosphate esters emulsifiers, polyamino carboxylic emulsifiers, protein emulsifiers, quaternary emulsifiers, sarcosine emulsifiers, silicone emulsifiers, siloxane emulsifiers, sorbitan emulsifiers, sulfosuccinate emulsifiers, sucrose esters, ethoxylated alcohol sulfates, ethoxylated alcohol sulfates, sulfates and sulfonates of ethoxylated alkyl phenols, sulfates of fatty acids, sulfates of oils, sulfonates of oils, sulfates of fatty acids, sulfonates of fatty acids, sulfonates of alkyl aryls, sulfonates of naphthalenes, sulfonates of dodecyl and tridecylbenzenes, sulfonates of petroleum, tridecyl and dodecyl benzene sulfonic acids, taurates, tertiary amine oxides, and thio and mercapto emulsifiers. Representatives of nonionic emulsifying agents include polyoxyethylene sorbitan tristearate, polyoxyethylene sorbitan mono-oleate,

polyoxyethylene sorbitan monopalmitate, sorbitan monopalmitate, polyoxyethylene sorbitan trioleate, polyoxyethylene sorbitan monostearate, polyoxyethylene alkyl phenol, polyoxyethylene sorbitan monolaurate, polyoxyethylene oxypropylene stearate, glycerol monostearate, propylene glycol fatty acid ester, and the like. Representatives of anionic emulsifying agents include triethanolamine oleate, sodium oleate, calcium stearoxyl-2-lactylate, calcium dodecylbenzene sulfonate, ammonium lauryl sulfate, sodium alkyl sulfate, triethanolamine lauryl sulfate, **sodium dodecylsulfate**, and the like. Exemplary cationic emulsifiers include high molecular weight fatty amine blends, polyoxyethylene fatty amines, polyoxyethylene tallow amines, N-cetyl-N-ethyl morpholinium ethyl sulfate, and the like. The emulsifiers are known in McCutcheon's Detergents and Emulsifiers, North American Edition (1979) and International Edition (1979), in the Encycloedia of Chemical Technology, by Kirk-Othmer, 3rd Ed. Vol. 8, pp 900-30, (1984), and in the Cosmetic, Toiletry, and Fragrance Association Cosmetic Ingredient Dictionary 3rd Ed., (1982) and 3rd Ed., Supplement (1985).

DETD The subcoat comprises an optional hydrophilic enhancer or blends of hydrophilic enhancers that aid in transporting fluid from the environment of use into a dosage form. The hydrophilic enhancers in one embodiment are polyhydric alcohols and derivatives thereof, such as polyalkylene glycols of the formula  $H-(O-alkylene)_{sub.n}OH$ , wherein the bivalent alkylene radical is a straight or branched chain of from 1 to 10 carbons and n is 1 to 500 or higher. Typical glycols comprise polyethylene glycols 300, 400, 600, 1500, 3350, 4000 and 6000 of the formulae  $H(OCH_{sub.2}CH_{sub.2})_{sub.n}OH$  wherein n is, respectively, 5 to 5.7, 8.2 to 9.1, 12.5 to 13.9, 29 to 36, 29.8 to 37, 68 to 84, and 158 to 204. Other polyglycols comprise the low molecular weight glycols such as polypropylene glycol, polybutylene glycol and polyamylene glycol. Other hydrophilic enhancers include glycerin, sucrose, polyvinyl pyrrolidone, hydroxypropyl methylcellulose, hydroxypropyl cellulose, sorbitol, fructose, mannitol, citric acid, sodium citrate or entirely active materials such as finely divided cellulose acetate trimellitate, cellulose acetate phthalate, hydroxypropyl methylcellulose phthalate, acrylic copolymers, **polyvinyl acetate** phthalate. The amount of hydrophilic enhancer in the aqueous emulsion is 0% to 70%, more preferably from 2.5% to 60%, with water and the concentration of oil ingredients in the aqueous coating composition equal to 100%. Hydrophilic enhancers are known in U.S. Pat. No. 4,160,020.

DETD The osmagent optionally present in an osmotic dosage form coated according to the mode and the manner of the invention comprise magnesium sulfate, magnesium chloride, sodium chloride, lithium chloride, potassium sulfate, sodium carbonate, sodium sulfite, lithium sulfate, potassium chloride, **sodium sulfate**, mannitol, urea, sorbitol, inositol, raffinose, fructose, sucrose, glucose, maltodextrin and the like. The osmagents are known in U.S. Pat. No. 4,327,725.

DETD The coating composition can be applied to a drug core by standard manufacturing techniques. For example, one manufacturing procedure is the air suspension technique. The air suspension procedure consists in suspending and tumbling the drug core to be coated in a current of air and the coating composition until a coat is applied to the drug core. Air suspension procedures are known in U.S. Pat. No. 2,799,241; in J. Am. Pharm. Assoc., Vol. 48, pp 451-59; (1959), and ibid. Vol. 49, pp 82-4, (1960). Drug cores can be coated with a coating composition in a Wurster.RTM. air suspension coater or in an Aeromatic.RTM. air suspension coater. Other coating procedures such as pan coating can be used for applying a subcoat or an overcoat. Generally the subcoat will be about 2 to 20 mils, usually 3 to 10 mils, thick and the overcoat will be about 1 to 12 mils and, more preferably, 1 to 6 mils thick. The polymers used to provide the subcoat can be milled in a vehicle of either gas or liquid to a fine particle size by using an impact mill, an air jet, a microfluidizer, an attrition mill, ball mill, cage mill, colloid mill, cone mill, grinding mill, hammer mill, and the like. Another technique that can be used to form finely divided polymers is to dissolve the polymer in an organic solvent, which is emulsified in water

with a surfactant and then vacuum-off the solvent. For example, cellulose acetate comprising an acetyl content of 39.8% is dissolved in cyclohexanone or ethyl acetate, isopropanol blends, with **sodium lauryl sulfate** and the mixture is emulsified in water with shear. The organic solvent(s) then is (are) drawn off under reduced pressure, leaving aqueous dispersion of finely divided cellulose acetate. This dispersed cellulose acetate is then coated according to the process of this invention. Another example comprises plasticizing a polymer such as ethyl cellulose, melting it and dispersing the melt in water with high shear and elevated temperature.

DETD A dosage form adapted, designed and shaped as an osmotic drug delivery system is manufactured as follows: first, a drug containing composition as expressed on a percentage basis of the final composition is prepared by passing through a 40 mesh screen 73.40 weight percent (wt. %) polyethylene oxide having a molecular weight of 200,000 grams per mole. Then, 20.10 wt. % of nifedipine and 5.00 wt. % hydroxypropylmethyl cellulose having an average molecular weight of 11,200 grams per mole is added to the polyethylene oxide and the three ingredients mixed for about 10 minutes in a conventional mixer. While the three ingredients are mixing, denatured, **anhydrous** ethanol is added q.s. slowly to the mixer and the mixing continued for an additional 5 minutes. The wet granulation is passed through a 20 mesh screen, dried at room temperature for 16 hours and passed again through a 20 mesh screen. Finally, 1.5 wt. % of magnesium stearate is added to the granulation and all the ingredients mixed in a roller mill for 1 to 3 minutes.

DETD A second composition is prepared by mixing 64.30 wt. % of polyethylene oxide having a molecular weight of 5,000,000 grams per mole with 29.20 wt. % sodium chloride and the mix is passed through a 40 mesh screen. Then, the just prepared mixture is mixed with 5.00 wt. % hydroxypropylmethylcellulose having a number average molecular weight of 9,200 grams per mole and 1.00 wt. % ferric oxide for 10 minutes in a mixer. Then, **anhydrous** ethanol q.s. is slowly added to the blending mixture and all the ingredients mixed for an additional 5 minutes. The freshly prepared wet granulation is passed through a 20 mesh screen, allowed to dry at room temperature for 16 hours, and again passed through a 20 mesh screen. The screened granulation is mixed with 0.50 wt. % of magnesium stearate in a roller mill for 1 minute.

L71 ANSWER 6 OF 8 USPATFULL

AN 90:46411 USPATFULL

TI Chemical pellets for aquatic attack protection belt

IN **Schneider, David P.**, 4 Woodside Dr. East, Apalachin, NY,  
United States 13732

PI US 4933187 19900612

AI US 1989-394818 19890817 (7)

RLI Continuation-in-part of Ser. No. US 1988-199468, filed on 27 May 1988

DT Utility

EXNAM Primary Examiner: Page, Thurman K.; Assistant Examiner: Spear, James M.

LREP Bleuer, Keith T.

CLMN Number of Claims: 2

ECL Exemplary Claim: 1

DRWN 8 Drawing Figure(s); 2 Drawing Page(s)

LN.CNT 319

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB A belt including a pair of opposite layers of sheet material and subdivided into a series of pockets for receiving pellets of **shark-repulsive** chemical. One of the pellets is untreated so as to dissolve in water relatively quickly, another of the pellets is impregnated with water soluble **glue**, another of the pellets is coated with the **glue** while a fourth of the pellets is coated with epoxy for preventing water application to the chemical of the pellet until the pellet is manually broken.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

IN **Schneider, David P.**, 4 Woodside Dr. East, Apalachin, NY,

United States 13732

- AB A belt including a pair of opposite layers of sheet material and subdivided into a series of pockets for receiving pellets of **shark**-repulsive chemical. One of the pellets is untreated so as to dissolve in water relatively quickly, another of the pellets is impregnated with water soluble **glue**, another of the pellets is coated with the **glue** while a fourth of the pellets is coated with epoxy for preventing water application to the chemical of the pellet until the pellet is manually broken.
- SUMM The invention relates to wearing apparel for humans having built in receptacles for containing chemicals that will protect a person from attacks of fish, such as **sharks**, in the water; and more particularly the invention relates to such wearing apparel in the form of belts that may be used about the waist of the wearer or about his wrists or ankles. **Shark** attack has long been recognized as a serious problem, and many solutions have been proposed. One of the proposed solutions is to provide antishark suits formed of steel mesh, but such a suit is quite heavy and is correspondingly unmanageable.
- SUMM The invention is a general improvement on that disclosed in my U.S. Pat. No. 4,602,384 issued July 29, 1986 disclosing a **shark** protection suit, while the present invention in particular is to improved belts for wearer use.
- SUMM It is an object of the present invention to provide improved anti-**shark** pieces of wearing apparel, particularly belts that may be worn about the waist, the wrists or the ankles of the user having built in receptacles for **shark** repelling chemicals dissolvable in sea water, particularly those in pellet form. The belts preferably have water transmitting fabric forming one side of each of the receptacles so that sea water may enter the receptacles for dissolving the chemical therein.
- SUMM It is also an object of the present invention to provide reduced and controlled dissolving rates of the pellets for prolonging the duration of protection against all **sharks**. In this connection, it is an object to coat such pellets with a water soluble **glue** which must first dissolve before the sea water is effective on the pellet itself. It is also an object to provide a form of the pellet which is coated with an epoxy or other water impervious material so that the pellet must be broken manually or by the fish before the sea water can be effective on the interior of the pellet.
- DRWD FIG. 1 is an isometric view of a **shark** repellent belt having a series of pockets holding pellets of **shark** repellent chemical;
- DRWD FIG. 6 is an isometric view of one of the pellets of **shark** repellent chemical which in this case is a "white" pellet;
- DETD Cubes or pellets 50, 52, 54 and 56 are disposed respectively in the pockets 16a-16d. These pellets are basically the same except that the pellet 52 is impregnated with a water soluble **glue**; the pellet 54 is also impregnated with the **glue** but in addition has a coating 58 on its exterior surface of the **glue**; and the pellet 56 is of the same type as the pellet 54 but is in addition provided with a red coating 60 (see FIG. 8) for purposes to be described. The pellet 50 is the basic type and is made of a dry, granular **anhydrous sodium sulfate** and liquid **sodium lauryl sulfate** mixed together in equal parts by volume and dried so that the pellet 50 when so formed retains its cube form in the pocket 16a rather than spreading into granular particles. Such chemical cubes so formed can also accept the addition of varying amounts of **polyvinyl acetate** resin latex (commonly known as organic, water soluble, white liquid **glue**) which adds the effect of prolonging the time for a given volume of the mixture to dissolve into water when the cubes made from it are immersed in water. The pellet 52 is of the latter type in which the chemicals are mixed together with the white liquid **glue** being an additional

component of the mixture. In order to form the pellet 52, the normal amount of liquid white **glue** to add is one part by volume to every two parts of liquid **sodium lauryl**

**sulfate** by volume, although 50% more or less **glue** by volume may be used to vary the time required to dissolve the cube.

DETD The pellet 54 is identical with the pellet 52 except that in addition to containing the white liquid **glue** as a component, it also has a coating 58 of this **glue** so as to further delay the dissolving rate of the cube.

DETD The pellets 50, 52 and 54 are usually white, while the pellet 56 is usually red in color. The pellet 56 is shown in FIGS. 7 and 8 and will be observed to have the first coating 58 and the second coating 60. The first coating 58 is of the white **glue** previously mentioned, and the second coating 60 is a coating of waterproof epoxy having permanent red ink mixed with the coating, this ink being of the same type as used in writing pens.

DETD When the belt is immersed with the user in sea water, the fabric layer 10 forming one side of each of the pockets 16a-16d allows water passage to occur through layer 10 into each of these pockets. The cube 50 dissolves slowly into and through the pocket 16a and fabric layer 10 out into the sea water in which the human wearing the belt is immersed to form an aura of chemically treated and polluted water about the belt and its user. The presence of this dissolved chemical in the water offends all types of **sharks** to the extent that they refuse to stay any time at all in the vicinity of the person wearing the belt to thus protect the user.

DETD The cube 52 likewise dissolves into the sea water about the person wearing the belt but at a lower rate than the cube 50 due to the **glue** mixed in the cube 52. This thus prolongs the time for a given volume of the **sodium lauryl sulfate** mixture to dissolve into the water and prolongs the time of protection for the human wearing the belt. The cube 52 is of the same composition as the cube 50 but has the white liquid water soluble **glue** as a component of the mixture as described. The cube 54 functions in the same manner as the cubes 50 and 52 but prolongs the overall time of protection for the user, since the **glue** coating 58 on the cube 54 must first dissolve before the **sodium lauryl sulfate** interior of the cube 54 has water applied to it and dissolves. The red colored epoxy coating 60 on the cube 56 isolates the interior of the cube 56 from water and from dissolving until the cube 56 is manually bent enough to make the hard epoxy coating snap open to reveal the interior of the cube, and the red coloring is to show a user that this cube is waterproof and must be broken open before it will dissolve. The red cube 56 of course is visible through the transparent layer 12 to the user for this purpose. Needless to say, if a **shark** moves sufficiently close to the FIG. 1 belt as worn by the user and bites into any of the cubes 50, 52, 54 and 56, the sea water instantly dissolves the **sodium lauryl**

**sulfate** to pollute the water with this chemical and immediately drives the fish away. Since the cube 56 is coated with epoxy (or other waterproof coating material as will be described), this cube may be submerged for an indefinite time along with others of the same type.

DETD Although the FIG. 1 belt has been described for usage by a human, it may be also effective for protecting nautical hardware and for this purpose is simply wrapped around the hardware. For this usage, it may be desirable to use many of the cubes 56 protected by the epoxy or other waterproof coating 60 and to rely on a bite by a **shark** to open the chemical contents to melting for protection for an extended period of time.

DETD Other variations are also possible within the purview of the invention. For example, instead of a red dye for the cube 56, a purple dye or a green dye could be used and would indicate when the cube is broken, since the white interior of the cube only then would be visible through the transparent layer 12. Other types of melting inhibitors and controllers could also be used instead of the water soluble white **glue**. Starch for example could be used, and the thickness of the

coating 58 could also be varied to change the time at which the sea water reaches the interior of the cube 54. The water inhibiting epoxy coating 60 could also be of another type of water inhibitor, such as for example waterproof varnish or anti-fouling waterproof paint of the type commonly used for boat bottoms which would prevent the buildup of marine organisms that might retard dissolving of the pellets after prolonged contact with sea water. As another variation, the water penetratable sailcloth for the cloth 10 and 62 could be replaced by a water impenetratable cloth which would allow the belt to be used on nautical hardware and would be effective only when the **shark** bites through the belt and into one of the chemical cubes. Such a construction would assure that the cubes are effective for a much longer time than if the sea water is continuously in contact with the cubes. The horizontal tapes 26, 28, 30 and 32 are illustrated to hold the belts in place; and it will be obvious that one or more vertical tapes fastened along the lengths of the belts could be added for holding the belts on a piece of unusually shaped nautical hardware for example.

DETD It is thus apparent that there are two chemical compositions for the cubes. One for the cube 50 is fast melting and consists of only

**sodium lauryl sulfate** and **sodium**

**sulfate** while the second has these two chemicals mixed also with the white **glue** for retarding the melting effect. It will also be apparent that there are two types of coatings, the white **glue** on the pellet 54 and the epoxy or other waterproof coating on the pellet 56. These coatings may be used interchangeably, but the **glue** coating 58 beneath the epoxy coating 60 has a singular purpose of preventing the epoxy from penetrating into the porous chemical of which the pellet is formed thereby creating too thick a coating for a human to break once the coatings are cured and hard. If only the white

**glue** is used as a coating, it is much easier to break even though it soaks into the surface of the cube formed of the two chemicals above mentioned either with or without the **glue** as a component of the mixture. However for pellets to be used on marine hardware just the epoxy coating without an interior coating 58 of **glue** would be sufficient, since a human will not have to break one of these pellets open; a **shark** would be more than sufficient to accomplish this. It will be apparent that if desired, the colored ink could be mixed with the white **glue** used as a coating for helping a person to recognize the different types of pellets. Although the pellets are shown as cubes, it will be apparent that the pellets could as well have other shapes, such as disc or star-shaped. The pellets could also, instead of being dried at room temperature, be dried using an ultra violet cure for example; and it may be noted that the pellets after drying retain their shape even without the use of any **glue** at all or the use of any coatings. All of the pellets of all of the types disclosed have infinite shelf life if not immersed in water.

DETD It is thus apparent that I have disclosed a relatively fast melting pellet 50 with only the two basic chemicals as constituents, a slower melting pellet 52 with the white **glue** as a component of the mixture, a still slower melting pellet 54 with a white **glue** coating and the fourth pellet 56 which is not affected by being submerged in water until the pellet is broken open by manual effort or by an attacking **shark**.

DETD The **sodium lauryl sulfate** above mentioned is the chemical or surfactant in the pellets 50, 52, 54 and 56 that offends the **sharks** when the pellets dissolve in sea water. Possible substitute chemicals or surfactants are sodium dodecyl sulfate, sodium octyl sulfate and sodium octyl/decyl sulfate, all members of a family called alkyl sulfate surfactants. Another substitutable family of surfactants or chemicals and effective for offending **sharks** when dissolved are the nonionic hydrocarbon surfactants.

DETD White **glue** has been mentioned to delay the melting of the slower melting pellets, and this **glue** may be replaced by common gelatin of the type used in medicine capsules. For this purpose, water soluble waxes may also be used.

DETD The pellets may be formed in any suitable manner. For example, the

chemicals of the pellets may be emulsified into a glycerine base and formed into the pellets, and these may be other than equal in dimensions on all edges and may be in the form of an ordinary bar of soap, for example, which has one long dimension in comparison to the others. Also, the pellets may be formed in the form of a **shark**, for example, which would alert users not to use the pellets as bars of soap. Distinctive coloring may also be added to the chemicals of the pellets if desired. Also, initially, the chemicals for the pellets may come in the form of flakes or liquid.

DETD Using **sodium sulfate** and **sodium**

**lauryl sulfate** for the pellets, as first mentioned, 10% by volume of white **glue** may be used for helping to stabilize the pellets in cake form.

CLM What is claimed is:

1. A pellet formed of granular **anhydrous sodium sulfate**, liquid **sodium lauryl sulfate**, a water soluble white liquid **glue** comprised of **polyvinyl acetate**, for retarding the dissolution of the pellet in water, coated with an epoxy coating, which effectively shields the interior of the pellet until the pellet is broken.

2. A pellet as set forth in claim 1 and including water soluble white liquid **glue** with which the pellet is impregnated for the purpose of retarding the dissolution of the pellet in water, the amount of the **glue** being about 10% by volume of the pellet.

IT **Shark**

(repellents for, pellets contg. sodium sulfate and sodium lauryl sulfate as, in protective belts)

IT 9003-20-7, Poly(vinyl acetate)

(glue, for shark-repelling pellets, in protective belts)

IT 151-21-3, Sodium lauryl sulfate, biological studies

7757-82-6, Sodium sulfate, biological studies

(shark-repellent pellets contg., in protective belts)

IT 9003-20-7, Poly(vinyl acetate)

(glue, for shark-repelling pellets, in protective belts)

RN 9003-20-7 USPATFULL

CN Acetic acid ethenyl ester, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 108-05-4

CMF C4 H6 O2

AcO-CH=CH<sub>2</sub>

IT 151-21-3, Sodium lauryl sulfate, biological studies

7757-82-6, Sodium sulfate, biological studies

(shark-repellent pellets contg., in protective belts)

RN 151-21-3 USPATFULL

CN Sulfuric acid monododecyl ester sodium salt (8CI, 9CI) (CA INDEX NAME)

HO<sub>3</sub>SO-(CH<sub>2</sub>)<sub>11</sub>-Me

Na

RN 7757-82-6 USPATFULL

CN Sulfuric acid disodium salt (8CI, 9CI) (CA INDEX NAME)

in receptacles for **shark** repelling chemicals dissolvable in sea water, particularly those in pellet form. The belts preferably have water transmitting fabric forming one side of each of the receptacles so that sea water may enter the receptacles for dissolving the chemical therein.

- SUMM It is also an object of the present invention to provide reduced and controlled dissolving rates of the pellets for prolonging the duration of protection against all **sharks**. In this connection, it is an object to coat such pellets with a water soluble **glue** which must first dissolve before the sea water is effective on the pellet itself. It is also an object to provide a form of the pellet which is coated with an epoxy or other water impervious material so that the pellet must be broken manually or by the fish before the sea water can be effective on the interior of the pellet.
- DRWD FIG. 1 is an isometric view of a **shark** repellent belt having a series of pockets holding pellets of **shark** repellent chemical;
- DRWD FIG. 6 is an isometric view of one of the pellets of **shark** repellent chemical which in this case is a "white" pellet;
- DETD Cubes or pellets 50, 52, 54 and 56 are disposed respectively in the pockets 16a-16d. These pellets are basically the same except that the pellet 52 is impregnated with a water soluble **glue**; the pellet 54 is also impregnated with the **glue** but in addition has a coating 58 on its exterior surface of the **glue**; and the pellet 56 is of the same type as the pellet 54 but is in addition provided with a red coating 60 (see FIG. 8) for purposes to be described. The pellet 50 is the basic type and is made of a dry, granular **anhydrous sodium sulfate** and liquid **sodium lauryl sulfate** mixed together in equal parts by volume and dried so that the pellet 50 when so formed retains its cube form in the pocket 16a rather than spreading into granular particles. Such chemical cubes so formed can also accept the addition of varying amounts of **polyvinyl acetate** resin latex (commonly known as organic, water soluble, white liquid **glue**) which adds the effect of prolonging the time for a given volume of the mixture to dissolve into water when the cubes made from it are immersed in water. The pellet 52 is of the latter type in which the chemicals are mixed together with the white liquid **glue** being an additional component of the mixture. In order to form the pellet 52, the normal amount of liquid white **glue** to add is one part by volume to every two parts of liquid **sodium lauryl sulfate** by volume, although 50% more or less **glue** by volume may be used to vary the time required to dissolve the cube.
- DETD The pellet 54 is identical with the pellet 52 except that in addition to containing the white liquid **glue** as a component, it also has a coating 58 of this **glue** so as to further delay the dissolving rate of the cube.
- DETD The pellets 50, 52 and 54 are usually white, while the pellet 56 is usually red in color. The pellet 56 is shown in FIGS. 7 and 8 and will be observed to have the first coating 58 and the second coating 60. The first coating 58 is of the white **glue** previously mentioned, and the second coating 60 is a coating of waterproof epoxy having permanent red ink mixed with the coating, this ink being of the same type as used in writing pens.
- DETD When the belt is immersed with the user in sea water, the fabric layer 10 forming one side of each of the pockets 16a-16d allows water passage to occur through layer 10 into each of these pockets. The cube 50 dissolves slowly into and through the pocket 16a and fabric layer 10 out into the sea water in which the human wearing the belt is immersed to form an aura of chemically treated and polluted water about the belt and its user. The presence of this dissolved chemical in the water offends all types of **sharks** to the extent that they refuse to stay any time at all in the vicinity of the person wearing the belt to thus protect the user.
- DETD The cube 52 likewise dissolves into the sea water about the person

wearing the belt but at a lower rate than the cube 50 due to the **glue** mixed in the cube 52. This thus prolongs the time for a given volume of the **sodium lauryl sulfate** mixture to dissolve into the water and prolongs the time of protection for the human wearing the belt. The cube 52 is of the same composition as the cube 50 but has the white liquid water soluble **glue** as a component of the mixture as described. The cube 54 functions in the same manner as the cubes 50 and 52 but prolongs the overall time of protection for the user, since the **glue** coating 58 on the cube 54 must first dissolve before the **sodium lauryl sulfate** interior of the cube 54 has water applied to it and dissolves. The red colored epoxy coating 60 on the cube 56 isolates the interior of the cube 56 from water and from dissolving until the cube 56 is manually bent enough to make the hard epoxy coating snap open to reveal the interior of the cube, and the red coloring is to show a user that this cube is waterproof and must be broken open before it will dissolve. The red cube 56 of course is visible through the transparent layer 12 to the user for this purpose. Needless to say, if a **shark** moves sufficiently close to the FIG. 1 belt as worn by the user and bites into any of the cubes 50, 52, 54 and 56, the sea water instantly dissolves the **sodium lauryl**

**sulfate** to pollute the water with this chemical and immediately drives the fish away. Since the cube 56 is coated with epoxy (or other waterproof coating material as will be described), this cube may be submerged for an indefinite time along with others of the same type. DETD Although the FIG. 1 belt has been described for usage by a human, it may be also effective for protecting nautical hardware and for this purpose is simply wrapped around the hardware. For this usage, it may be desirable to use many of the cubes 56 protected by the epoxy or other waterproof coating 60 and to rely on a bite by a **shark** to open the chemical contents to melting for protection for an extended period of time.

DETD Other variations are also possible within the purview of the invention. For example, instead of a red dye for the cube 56, a purple dye or a green dye could be used and would indicate when the cube is broken, since the white interior of the cube only then would be visible through the transparent layer 12. Other types of melting inhibitors and controllers could also be used instead of the water soluble white **glue**. Starch for example could be used, and the thickness of the coating 58 could also be varied to change the time at which the sea water reaches the interior of the cube 54. The water inhibiting epoxy coating 60 could also be of another type of water inhibitor, such as for example waterproof varnish or anti-fouling waterproof paint of the type commonly used for boat bottoms which would prevent the buildup of marine organisms that might retard dissolving of the pellets after prolonged contact with sea water. As another variation, the water penetratable sailcloth for the cloth 10 and 62 could be replaced by a water impenetratable cloth which would allow the belt to be used on nautical hardware and would be effective only when the **shark** bites through the belt and into one of the chemical cubes. Such a construction would assure that the cubes are effective for a much longer time than if the sea water is continuously in contact with the cubes. The horizontal tapes 26, 28, 30 and 32 are illustrated to hold the belts in place; and it will be obvious that one or more vertical tapes fastened along the lengths of the belts could be added for holding the belts on a piece of unusually shaped nautical hardware for example.

DETD It is thus apparent that there are two chemical compositions for the cubes. One for the cube 50 is fast melting and consists of only **sodium lauryl sulfate** and **sodium sulfate** while the second has these two chemicals mixed also with the white **glue** for retarding the melting effect. It will also be apparent that there are two types of coatings, the white **glue** on the pellet 54 and the epoxy or other waterproof coating on the pellet 56. These coatings may be used interchangeably, but the **glue** coating 58 beneath the epoxy coating 60 has a singular purpose of preventing the epoxy from penetrating into the porous chemical of which

the pellet is formed thereby creating too thick a coating for a human to break once the coatings are cured and hard. If only the white **glue** is used as a coating, it is much easier to break even though it soaks into the surface of the cube formed of the two chemicals above mentioned either with or without the **glue** as a component of the mixture. However for pellets to be used on marine hardware just the epoxy coating without an interior coating 58 of **glue** would be sufficient, since a human will not have to break one of these pellets open; a **shark** would be more than sufficient to accomplish this. It will be apparent that if desired, the colored ink could be mixed with the white **glue** used as a coating for helping a person to recognize the different types of pellets. Although the pellets are shown as cubes, it will be apparent that the pellets could as well have other shapes, such as disc or star-shaped. The pellets could also, instead of being dried at room temperature, be dried using an ultra violet cure for example; and it may be noted that the pellets after drying retain their shape even without the use of any **glue** at all or the use of any coatings. All of the pellets of all of the types disclosed have infinite shelf life if not immersed in water.

DETD It is thus apparent that I have disclosed a relatively fast melting pellet 50 with only the two basic chemicals as constituents, a slower melting pellet 52 with the white **glue** as a component of the mixture, a still slower melting pellet 54 with a white **glue** coating and the fourth pellet 56 which is not affected by being submerged in water until the pellet is broken open by manual effort or by an attacking **shark**.

CLM What is claimed is:

1. A belt comprising strips of opposite layers and means for fixing the ends of the strips together so as to form an endless belt, means for forming a series of discrete pockets in said belt formed by said opposite layers and means providing a releasable closure on an end of each of said pockets, a body of chemical inserted into each of said pockets, at least one of said layers being pervious to water so that the chemical can dissolve in the water to produce an aura of chemically treated water in the vicinity of the belt, the chemicals in each of said pockets constituting pellets basically of **sodium lauryl sulfate** which when dissolved provides an aura of water about the belt flavored by said sulfate for repelling **sharks** away from the belt.

2. A belt as set forth in claim 1, one of said pellets being impregnated with water soluble liquid **glue** for retarding the dissolution of the pellet.

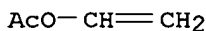
3. A belt as set forth in claim 1, one of said pellets being provided with a coating of water soluble **glue** for retarding the dissolution of the chemical.

6. A pocketed composite strip comprising a pair of opposite layer strips fixed together, means for forming a series of discrete pockets in said composite strip formed by said opposite layer strips, means providing a releasable closure on an end of each of said pockets, a body of chemical inserted into each of said pockets, at least one of said layers being pervious to water so that the chemical can dissolve in the water to produce an aura of chemically treated water in the vicinity of said composite strip, and fastening means on the opposite ends of said composite strip by means of which the ends of said composite strip may be attached to a member, the chemicals in each of said pockets constituting pellets basically of a certain **shark** repelling chemical which when dissolved provides an aura of water about the strip flavored by said certain chemical for repelling **sharks** away from the strip.

IT **Shark**

(repellents for, pellets contg. sodium sulfate and sodium lauryl sulfate as, in protective belts)

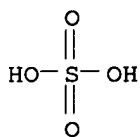
IT 9003-20-7, Poly(vinyl acetate)  
 (glue, for shark-repelling pellets, in protective belts)  
 IT 151-21-3, Sodium lauryl sulfate, biological studies  
 7757-82-6, Sodium sulfate, biological studies  
 (shark-repellent pellets contg., in protective belts)  
 IT 9003-20-7, Poly(vinyl acetate)  
 (glue, for shark-repelling pellets, in protective belts)  
 RN 9003-20-7 USPATFULL  
 CN Acetic acid ethenyl ester, homopolymer (9CI) (CA INDEX NAME)  
 CM 1  
 CRN 108-05-4  
 CMF C4 H6 O2



IT 151-21-3, Sodium lauryl sulfate, biological studies  
 7757-82-6, Sodium sulfate, biological studies  
 (shark-repellent pellets contg., in protective belts)  
 RN 151-21-3 USPATFULL  
 CN Sulfuric acid monododecyl ester sodium salt (8CI, 9CI) (CA INDEX NAME)



RN 7757-82-6 USPATFULL  
 CN Sulfuric acid disodium salt (8CI, 9CI) (CA INDEX NAME)



2 Na

L71 ANSWER 8 OF 8 USPATFULL  
 AN 86:41603 USPATFULL  
 TI Aquatic attack protection suit and material therefor  
 IN **Schneider, David P.**, 4 Woodside Dr. E., Apalachin, NY, United States 13732  
 PI US 4602384 19860729  
 AI US 1983-529380 19830906 (6)  
 RLI Continuation-in-part of Ser. No. US 1980-198589, filed on 20 Oct 1980, now abandoned  
 DT Utility  
 EXNAM Primary Examiner: Hunter, H. Hampton  
 LREP Bleuer, Keith T.  
 CLMN Number of Claims: 8  
 ECL Exemplary Claim: 4,6  
 DRWN 6 Drawing Figure(s); 2 Drawing Page(s)  
 LN.CNT 335  
 AB A suit for protecting the wearer against shark attack including a

plurality of cells formed in the material of the suit which contain a shark-repulsive chemical. The material of which the suit is made includes an inner ply of strong filamentary fabric capable of resisting shark bite and an outer ply of relatively thin, frangible material, with the cells carrying the shark-repulsive chemical being formed between the two plies. Other chemicals alternately may be used in the cells for other purposes, such as for heating purposes on the interaction of two initially separated chemicals in the cells.

IN **Schneider, David P.**, 4 Woodside Dr. E., Apalachin, NY, United States 13732

DETD The chemical 14 may, for example be **sodium lauryl sulfate**, in the form of a powder. This chemical is harmless to humans, but when mixed with sea water it attacks the tissues of a shark's gills and can kill a shark in only small quantities. It is contemplated that each of the cells 17 shall be of substantial size and capacity so that a substantial amount of the chemical 14 is contained in each of the cells. The cells, for example, can be one to two inches in diameter and can be one-half inch to one inch, for example, in thickness. Thus, the volume of a cell 17 can, for example, be about 1.5 cubic inches and can well vary from 1 to 4 cubic inches with changes in dimensions of the cells. The amount of chemical 17 in the cells takes up about 80% to 90% of this volume. This substantial volume of chemical assures that when a person wearing a protective suit according to the invention is attacked by a shark, sufficient quantities of the chemical will be released to cause the shark to either be seriously injured or at least retreat. Substantially, the complete surfaces of the suits of the invention have the cells 17 in them; and there may be, for example, a spacing of less than an inch, about one-fourth inch, between the cells 17. Care is taken in making the suits so that none of the cells 17 is punctured in making any necessary seams in the material 21 to release the chemical therein.

DETD The fabric 12 is worn next to the skin of a person using the suits of the invention so that the relatively frangible polyethylene sheet 13 is exposed to the outside. The successful use of the suits of the invention depends to a large extent on the way most sharks normally attack. Most sharks first nibble the apparent prey, apparently to first taste the prey before actually taking a determined bite. During this first nibbling by the shark, since the sheet 13 is thin and frangible, the polyethylene sides of the cells 17 so nibbled by the shark are completely destroyed and release the chemical 14 in these cells. A shark's teeth are long and very sharp and are capable of inflicting grievous wounds on a swimmer, but since most sharks only nibble initially, these teeth only are effective at that time to destroy the coverings of the cells 17 so attacked to release the chemical 14. As previously mentioned, the chemical 14 is of a type, such as **sodium lauryl sulfate**, to disable the shark; and he thus is either seriously injured or at least is repulsed immediately. Although the fabric 12 is flexible, so that the user may easily swim, it nevertheless has great tensile strength and stretches only a small amount under biting pressure from the shark and materially impedes shark teeth to constitute a strong protective device, affording good protection to the user.

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L72 5054 S L18,L19  
E SODIUM LAURYL SULFATE/DCN  
E E7+ALL/DCN  
L73 5533 S E2 OR L72  
L74 5575 S L22  
L75 6049 S NASO4 OR NA2SO4 OR NA3SO4 OR (NA OR NA2 OR NA3)()SO4  
E SODIUM SULFATE/DCN  
E E3+ALL/DCN  
L76 4655 S E2 OR 1744/DRN  
L77 149 S L73 AND L74-L76  
L78 1 S L77 AND (GLUE# OR GLUING OR GLUEING)  
L79 48726 S R01848/DCN OR 1848/DRN OR L37  
L80 5 S L77 AND L79  
L81 1 S SCHNEIDER D?/AU AND L73  
E SCHNEIDER D/AU  
L82 138 S E3,E13  
L83 2 S L82 AND SHARK?  
L84 2 S L81,L83,L78  
L85 1 S L80 AND L84  
L86 2 S L84,L85  
L87 4 S L80 NOT L86  
L88 2 S A04-F08/MC AND L77  
L89 3 S L86,L88

FILE 'WPIDS' ENTERED AT 07:41:14 ON 17 NOV 2000

=> d all abeq tech dcn tot 189

L89 ANSWER 1 OF 3 WPIDS COPYRIGHT 2000 DERWENT INFORMATION LTD

AN 1990-238498 [31] WPIDS

DNC C1990-103138

TI **Shark-repellent pellet** - comprises **sodium sulphate, sodium lauryl sulphate, polyvinyl acetate** to retard dissolution, and epoxy coating.

DC A14 A21 A97 B05 C03

IN **SCHNEIDER, D P**

PA (SCHN-I) SCHNEIDER D P

CYC 1

PI US 4933187 A 19900612 (199031)\*

ADT US 4933187 A US 1989-394818 19890817

PRAI US 1988-199468 19880527; US 1989-394818 19890817

IC A61K009-14

AB US 4933187 A UPAB: 19930928

A pellet is claimed, formed of granular anhydrous **Na2SO4**, liq. **sodium lauryl sulphate (SLS)**, a water-soluble white liq. **glue** comprising PVAc for retarding dissolution of the pellet in water, coated with an epoxy coating, which

effectively shields the interior of the pellet until the pellet is broken.

Amt. of **glue** is pref. ca. 10% of pellet vol.

USE/ADVANTAGE - Useful as a **shark** repellent for incorporation in belts worn about the waist, wrist or ankle. The pellet provides reduced and controlled dissolution rates for prolonged protection. The pellet may also be used for protecting nautical hardware.  
0/8

FS CPI

FA AB; DCN

MC CPI: **A04-F08**; A05-A01E4; A12-B07; A12-F01; A12-T; B04-C03B; B05-A01B; B10-A09A; B12-M10A; B12-M11D; B12-N06; C04-C03B; C05-A01B; C10-A09A; C12-M10A; C12-M11D; C12-N06

M1 \*03\* DCN: **R01848-M**

M1 \*04\* DCN: R02044-M

M2 \*01\* DCN: **R01744-M**

M2 \*02\* DCN: **R05327-M**

L89 ANSWER 2 OF 3 WPIDS COPYRIGHT 2000 DERWENT INFORMATION LTD

AN 1990-155707 [20] WPIDS

DNN N1990-121037

TI Aquatic attach protection belt and chemical pellets - includes pair of opposite layers of sheet material and subdivided into series of pockets for receiving pellets of **shark** repulsive chemical.

DC P24 Q24 Q34

IN **SCHNEIDER, D P**

PA (SCHN-I) SCHNEIDER D P

CYC 1

PI US 4917280 A 19900417 (199020)\*

ADT US 4917280 A US 1988-199468 19880527

PRAI US 1988-199468 19880527

IC A45F003-00; B63C011-02; B65D083-00

AB US 4917280 A UPAB: 19930928

The belt includes a pair of opposite layers of sheet material and subdivided into a series of pockets for receiving pellets of **shark** -repulsive chemical. One of the pellets is untreated so as to dissolve in water relatively quickly, another of the pellets is impregnated with water soluble glue.

Another of the pellets is coated with the glue while a fourth of the pellets is coated with epoxy for preventing water application to the chemical of the pellet until the pellet is manually broken.

1/8

FS GMPI

FA AB; GI

\*\*\*\* NO CHEMICAL AND POLYMER INDEXING AVAILABLE FOR THIS ACCESSION NUMBER

L89 ANSWER 3 OF 3 WPIDS COPYRIGHT 2000 DERWENT INFORMATION LTD

AN 1975-51474W [31] WPIDS

TI Fire resistant vinal fibre mfr. - by addn. of PVC particles, 50-70 percent coated with emulsifiers, to a PVA emulsion, and spinning.

DC A14 F01

PA (KURS) KURARAY CO LTD

CYC 1

PI JP 50013625 A 19750213 (197531)\*

PRAI JP 1973-66232 19730611

AB JP 50013625 A UPAB: 19930831

An aq. PVC 300-600 A ( $\leq 5\%$   $> 800A$ ) of which 50-70% of the surface area is covered with absorbed emulsifiers, is added to an aq. PVAc (I) soln., and the mixt. is spun to give fire resistant fibres. In an example 30 pts. an aq. PVC emulsion contg. particles of av. diam. 400 A ( $> 800 A$  5%) and **Na lauryl sulphate** which covered 55% of the PVC surface area 3 pts. SnO<sub>2</sub> 75 degrees C to give a stable 17.2% polymer aq. dispersion. The dispersion was spun into an aq. soln. contg. 60g/l. NaOH and 200 g/l. **Na<sub>2</sub>SO<sub>4</sub>**, drawn 200%, neutralised with a soln. contg. 100 g/l. H<sub>2</sub>SO<sub>4</sub> and 300 g/l **Na<sub>2</sub>SO<sub>4</sub>**, drawn 200% in a soln. contg. 300 g/l. **Na<sub>2</sub>SO<sub>4</sub>** at 80 degrees C washed, dried, drawn 300% at 230 degrees C and heated to shrink 10% at 235 degrees C to give fibres

having O index 32%, tenacity 7.5/denier and tenacity retention after 100 hr of irradiation in a fadeometer 85%.

FS CPI

FA AB

MC CPI: A04-E02B; ~~A04-F08~~; A07-A02; A08-S05; A09-A01; A12-S05K;  
F01-D08; F03-C03



Creation date: 12-22-2003  
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Legal Date: 10-13-2000

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